SOUTH EAST EUROPE
Transnational Cooperation Programme

Programme co-funded by the EUROPEAN UNION

SNAP SEE
Planning Aggregates Supply

WP4
ACTIVITY WP4.1
Identification of data needs
(Data Dictionary)

- version 1 -

Project: SNAP-SEE, SEE/D/0167/2.4/X

Authors: K. Hatzilazaridou

Institution: EKBAA-IGME

INSTITUTE OF GEOLOGY & MINERAL EXPLORATION
I.G.M.E

Date: March, 2014

DELIVERABLE SUMMARY	
PROJECT INFORMATION	
Project acronym:	SNAP-SEE
Project title:	Sustainable Aggregates Planning in South East Europe
Contract number:	SEE/D/0167/2.4/X
Starting date:	1. 10. 2012
Ending date:	30. 9. 2014
Project website address:	http://snapsee.eu/
Lead partner organisation:	Montanuniversität Leoben
Address:	Franz-Josef-Strasse 18, Leoben, 2700 Austria
Project manager:	Günter Tiess
E-mail:	guenter.tiess@unileoben.ac.at
DELIVERABLE INFORMATION	
Title of the deliverable:	Data Dictionary
WP/activity related to the deliverable:	WP4 / Activity 4.1
Type (internal or restricted or public):	internal
Location (if relevant):	Athens, Greece
WP leader:	Technical University Crete (TUC)
Activity leader:	EKBAA-IGME & RGF
Participating partner(s):	
Author(s):	K. Hatzilazaridou (EKBAA-IGME)
E-mail:	kikihatz@igme.gr

Keywords: Data needs, aggregates, data dictionary, sustainable aggregates planning

This report should be cited in bibliography as follows: Hatzilazaridou K. 2014: Data Dictionary

CONTENTS

1 INTRODUCTORY INFORMATION

Assuring sustainable supply of aggregate resources is an important challenge due to their limited availability when aiming at sustainable regional development. Due to the regional differences and historical development, there are diverse approaches to aggregates policies, planning and management in South East Europe (SEE), which is hindering resource efficiency and economic development in the region. Successful planning for the management and supply of aggregates from primary and secondary resources requires a wide variety of supporting information to ensure that everything required is being taken into consideration. Otherwise, the objectives of the plan may be difficult or impossible to achieve, or plans created in the absence of adequate information may be unrealistic or even counter productive, particularly with respect to resource efficiency. It is also the case that in most SEE countries, secondary aggregates are not considered in planning for aggregates supply, e.g., volumes of available materials extracted from civil works are not reported and therefore are not considered. In order to support effective and sustainable National/regional plans for primary and secondary aggregates a range of data needed have to be identified.

The present report includes, the identified main data categories, the recommended formats and level of data collection, possible sources of data and a glossary of the most significant terms. The results of the evaluation of the collected activity's 4.1 questionnaires are summarized in chapter 4. The present report, combined with the report produced from activity 4.2 on data analysis methodologies, will form the basis for the Handbook on Data and Analysis methodologies for Aggregates Planning, which is the main output of Work Package 4 (WP4) of the project.

The report was compiled taking into account: 1) infomation from published documents and websites related to its content, 2) Best practices applied in other European countries, 3) information provided by the SNAP-SEE partners and contained in a questionnaire of activity 4.1 of the project that concerned the collection of information regarding data from their respective countries, and 4) the outputs of the SARMa project.

2 APPROACH

The present report was implemented within the activity 4.1: Identification of data needs of the SNAP-SEE project. The activity 4.1 had as a goal to identify data needs for planning for primary and secondary aggregates (e.g. quarry waste, C&DW, industrial waste, material excavated from civil works, e.t.c.) and create a data dictionary of data needs, definitions, sources, collection and storage.

To reach the above goal a questionnaire was elaborated with the aim to help SNAP-SEE project partners solicit information on data availability in their respective countries/regions and as a means to collect their views on the issue of identifying the needed data to support a sustainable aggregates planning. A preliminary set of data, regarding primary and secondary aggregate resources, was predifined and included in the questionnaire. Each partner collected information, on what kind of data are available in their respective country/region, under whose jurisdiction the data collection and reporting falls, and whether or not these data are currently being used in planning. More specifically, partners from the 13 SNAP-SEE countries/regions provided information on issues raised in the questionnaire regarding:

- Which data are considered important for aggregates planning;
- Which data are missing or not currently considered in planning;
- Degree of data availability and reliability and problems encountered that influence data collection and data reliability;
- Under whose jurisdiction the data collection, storage, reporting and updating falls;
- In which format are the data available;
- Level of data collection and sources;
- Which data analysis methods are utilized to turn raw data into useful supporting information for aggregates planning.

The information collected through the questionnaires was evaluated and interesting conclusions were drawn, regarding the data availablity in SEE countries, their format, source and level of data collection. The results of this evaluation are discussed in chapter 4.

3 DATA TYPES AND REQUIREMENTS TO SUPPORT SUSTAINABLE AGGREGATES PLANNING

3.1 The significance of aggregates planning

"Planning guides the future development and use of land. Planning is about where development should happen, where it should not and how it interacts with its surroundings. This involves promoting and facilitating development while protecting and enhancing the natural and build environment". [Source: *"Scottish planning Policy", the Scottish Government, 2010* www.scotland.gov.uk/publications/2010/02/03132605/12].

As aggregate resources are finite and are not evenly distributed, knowledge about their location is essential for making effective and sustainable planning decisions that consider the needs of future generations. Aggregates are essential for the development of a modern economy, but their extraction is subject to environmental and other constraints. Bringing together aggregates, environmental and other land-use information in an integrated system allows more effective and sustainable management strategies to be developed.

The safe and sufficient aggregates supply is a core task of the extractive industry. However, the public sector is responsible for providing basic spatial data such as general geo-scientific data and information that allows an economic evaluation of the raw materials.

An adequate and steady supply of aggregates is essential to support sustainable economic growth. Continuity of supply to meet demand depends largely on the availability of land with workable deposits having planning permission for extraction.

Planning authorities should have regard to the availability, quality, accessibility and requirement for aggregate resources in their area when preparing development plans. Development plans should identify suitable sites which may include existing aggregate extraction sites or industrial sites or locational criteria where the processing of secondary resources, including construction and demolition wastes can take place. Development plans should provide for the recycling of construction and demolition wastes in regeneration and new development, secondary material extracted as a consequence of winning primary minerals and the reworking of waste from other industrial processes. This may require new sites for storage and processing and, on construction sites, site waste management plans. [Source: *Scottish Planning Policy SPP4 "Planning for Minerals", Scottish Executive, 2006* www.scotland.gov.uk/publications/2006/08/30152427/0].

Aggregates are a basic material used in construction, and principally consist of primary aggregates which are extracted directly from the ground in quarries or pits and in some countries from sea-dredged materials. Secondary aggregates are produced as a by-product of other mining or quarrying activities or as a by-product of other industrial processes or derive from recycling of Construction and Demolition Waste (C&DW) (Fig. 3.1). In the context of resource efficiency aggregates demand should be fulfilled with a mix of primary and secondary aggregates (recycled construction and demolition waste, manufactured aggregates, excavated materials from civil works etc.) if the SEE region is to be an eco-efficient society that recycles. Generally the SEE region faces a lack of data to support aggregates planning and inadequate capacity and competence for addressing primary and/or secondary aggregates planning.

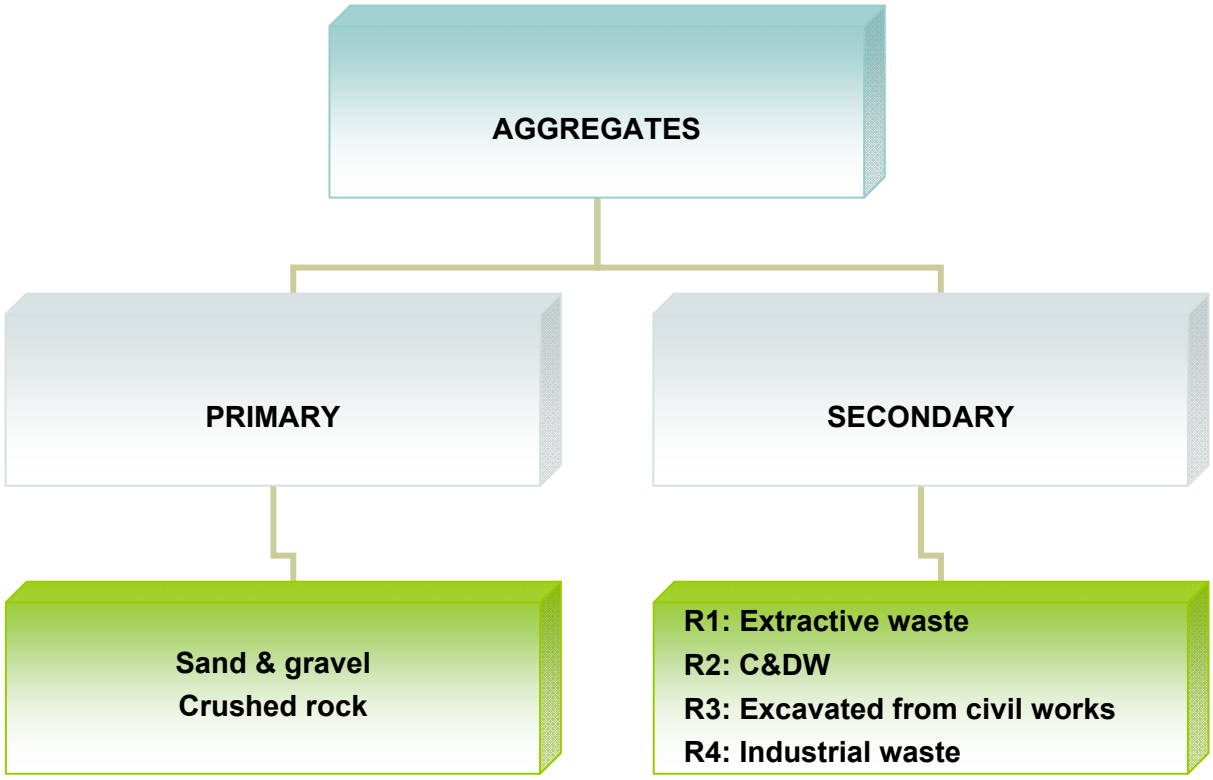

Fig. 3.1: Classification of potential aggregates' sources

3.2 The importance of safeguarding aggregate resources

Access to aggregate resources can be prevented or restricted by non-mineral development and the process of "safeguarding aggregate resources" ensures that this does not happen without a reason, when planning applications are determined. "Identifying and safeguarding mineral resources to meet the demand of society for raw materials, while taking into account other land uses is an essential part of a national land use policy for minerals. An appropriate national minerals policy and a land use planning policy ensure accessibility of mineral resources for the next generations. The Commission has confirmed that it is important for Member States to adopt and implement a land use planning policy for minerals in order to promote investment in extractive industries". [Source*: Quoted from the Preface of the European Commission Vice President Antonio Tajani in the Austrian Mineral Resources Plan (2012)*] .

A sustainable approach to aggregates' extraction should reconcile the need for aggregates with concern for the natural and built environment and communities in a manner that:

- safeguards aggregates as far as possible for future use;
- ensures a steady and adequate supply is maintained to meet the needs of society and the economy;
- encourages sensitive working practices during mineral extraction that minimize the environmental and transport impacts and once extraction has ceased, ensure sites are reclaimed to a high standard or enhance the value of the wider environment;
- promotes the use and recycling of secondary aggregate resources in development plan policies in addition to those for the release of sites for extraction of primary aggregates;
- protects international, national and locally designated areas of acknowledged natural or built heritage importance from adverse impacts and
- minimizes the potential adverse impact of aggregates extraction on Communities.

In order to accomplish the above mentioned goals, aggregates' safeguarding maps have to be compiled to assist planning authorities in the delineation of aggregates safeguarding areas (for more details see section 3.4.1).

3.3 Data needs

The provision and use of regular, reliable and up to date data is of outmost importance. The establishment of efficient procedure for data collection, management and data processing are necessary for the development of harmonized SARM (Sustainable Aggregates Resource Management) and SSM (Sustainable Supply Mix) policies. Data provide useful information that can be processed into a more readily accessible form for use by policy makers and decision making bodies as well as the general public. Sustainable aggregates planning, as many other disciplines, depends on good quality, reliable data but planning authorities do not always have the resources and capacity to collect basic data, so in many cases they rely on monitoring and data collection efforts by other agencies. In any case decision making should be based on the best available, scientifically sound data from widely recognized sources. “Perfect” data are not always necessary or possible, but data quality must be sufficient. Imperfect approximations might be used in case no direct data can be obtained.

3.3.1 Data storage, data format, sources and level of data collection

Once the basic data are selected and collected, usually they need to be compiled and stored in a data base. A database is an organized collection of data that is used to bring together all information about sustainable aggregates planning issues and may also include information about policies and references to other data sources. It is important to ensure the database(s) has continuity and is kept up to date by linking it to monitoring systems, so that data generated through monitoring are fed into the data base. Building such a data base is or can be a collaborative effort of various agencies, such as bureau of statistics, related ministries, regional authorities, national geological surveys and other research organizations.

Generally, data are categorized as bibliographical materials (including descriptive texts and reports), statistical tables, maps of various scales and remotely sensed data, but they can come in many forms such as:

Maps of various scales;

Satellite imagery, aerial photographs or other forms of visual data;

Computer data files;

Hard copies of reports and documents;

Tables, graphs and charts;

Data may be collected on national and or regional/ level depending on the level that the planning is applied.

3.4 Identification of main data categories for primary aggregates

3.4.1 Safeguard aggregate resources in land use plans

"Land use plans generally contain criteria determining what kind of development can take place in particular areas and are a typical example of plans which set the framework for future development consent". [Source: *SEA Directive 2001/42/EC "on the assessment of effects of certain plans and programmes on the environment"].* Decision-making for land-use allocation is also based on environmental considerations; examples include nature conservation areas and corridors for species migration, river-basin management and flood alleviation, and soil and water protection.

Policy decisions that define land use are mostly implemented through spatial planning and related functional zoning of land. This involves trade-offs between many sectoral interests, including industry, transport, communication, mining, agriculture and forestry.

An effective safeguarding system requires adoption of "mineral safeguarding areas" and the adoption of suitable policies through which development is managed in these areas. Although primary aggregates are geologically abundant their availability is reduced due to the designation of areas for other land uses. A sustainable aggregates' policy has to safeguard aggregate occurrences in land use planning in order to avoid any further conflicts. As in many cases areas containing aggregate resources are in contradiction with land use planning.

The aggregates safeguarding maps should hold information on the importance of identified resources on national, regional and local level, by classifying the resources accordingly.

The land use planning policy for aggregates should be supported by well structured and reliable data and must be developed based on the following:

- a digital geological knowledge base (comprising basic geological maps of 1:50.000. Additional geological surveying might be needed at the scale 1:25.000 to 1:10.000);
- a transparent methodology for identification of available aggregate resources (quality, quantity, local importance);

- long term estimates for regional and local demand for aggregates, taking into account other sources (e.g. secondary aggregate resources);

The data could be presented in smaller scale maps (e.g. 1:100.000) depending on the details required and the extent of the respective area covered.

The identification of conflict free areas could be done through a GIS based approach. Those resources, proved worth being protected because of quality, quantity and not coinciding with» no-go" or conflict zones in land use, shall be handed over to the responsible planning authorities (national or regional level) for having them declared as raw material safeguarding areas in land use planning.

How to produce an aggregates' safeguarding map

To this matter two examples of applied methodology are recommended and can be consulted through the following sources:

The Austrian Mineral Resources Plan which was selected by the Commission's ad hoc group (2010), established under the Raw Materials Supply Group, as a "best practice" example of a national land use policy for minerals: [Source:http://www.en.bmwfw.gv.at/Energy/Seiten/TheAustrianMineralResourcesPlan.aspx] and the approach followed by the British Geological Survey (BGS) and included in the report titled "Aggregates safeguarding maps of Wales", Keyworth, Nottingham, British Geological Survey, 2012.

3.4.2 Improve the knowledge base on the geological distribution of suitable primary aggregate resources

The quantity of aggregates that will be needed in the longer term depends on each county's state of the economy and the resulting level of construction activity, as well as the future availability of resources for investment in infrastructure.

Knowledge about aggregate resources is essential for making effective and sustainable planning decisions. Efficient and effective functioning of the planning system depends on high quality, readily accessible information on the extent, quality and, if possible, quantity of mineral resources and their relationship to national planning designations, which might represent constraints on the extraction of minerals. This information is important for the production of mineral development framework documents, both in the context of identifying areas of future mineral

working and the longer-term objective of minerals safeguarding by protecting important mineral resources against sterilisation.

A primary objective is to produce baseline data in a consistent format that can be updated, revised and customised to suit planning needs, including for use in the preparation of Mineral Development Plan Documents and Regional Spatial Strategies.

Evaluation of the aggregate resources

Identifying aggregate resources requires understanding of the location, scale, type and accessibility of the resource. Approaches used to identify aggregate resources vary in their level of detail and scale depending on the needs, pressures and availability of aggregate in an area. A common approach is to identify the aggregate resources in terms of its geological components and scale (recommended map scale 1:50.000). At these scales and in the absence of other data deriving from extraction sites, drilling and systematic sampling, can only give information about the surface extent of the aggregate resources, broad knowledge of their quality characteristics, showing areas within which potentially workable minerals may occur. National Geological Surveys are usually the data providers of such information i.e. on the quality and quantity of aggregate resources.

Identification of strategic aggregate resources should also identify other key factors that may affect access to and viability of, an aggregate resource in relation to its location and surrounding land uses. Therefore it is important that the regional/local planning authorities collect and compile all different levels of information on a map (recommended scale 1:100.000), with the use of GIS tools, that will be regularly updated. Four major elements of information could be presented on these summary (output) maps:

- the geological distribution of all onshore aggregate resources and the location of aggregate extraction sites
- the extent of mineral planning permissions
- the extent of selected landscape and nature–conservation designations

The impact of the mentioned restrictions regarding the access to aggregate resources and the supply of quality aggregate products should be periodically (e.g.

every 5 years) surveyed by the respective public administration, in cooperation with a range of interested stakeholders (e.g. industry, NGOs, local communities and authorities) and if needed corrective measures and alternative options adopted.

3.4.3	Assess the current extend of permitted reserves, the rate of depletion through sales, the rate of replacement through new permissions and the resultant length of landbanks

For planning purposes a *landbank* is commonly quoted for aggregate minerals. A landbank is the sum of all permitted reserves (in active and inactive sites) at a given point in time and for a given area. It is usually expressed in terms of years supply at an average rate of output. The area is usually an individual Mineral Planning Authority (MPA) or group of MPAs. Landbanks provide an indicator of the degree of need for new permissions to be granted. The minimum length of a landbank reflects the time needed to obtain planning permission and to bring a site into full production.
Planning authorities should ensure a landbank of permitted reserves for aggregates. Where market areas for aggregates extend across local authority boundaries, authorities should work together to ensure an adequate supply of minerals can be provided. This is particularly important in the city regions.
"It is important that stakeholders, including the aggregates industry engage in consideration of landbank issues. New consents should not be permitted if they are in locations which, in planning terms, are unsuitable or which lead to landbanks significantly in excess of market requirements. The need to identify areas of search may be obviated by accurate data on landbanks but should be reviewed in line with development plan schemes. The scale of the landbank should be set out in the local development plans.

3.4.4	Conduct aggregate mineral surveys (on aggregate sales, production / production capacity, consumption and imports/exports)

These surveys (compiled every 4 years intervals) should provide in-depth and up to date information on the national and regional sales, inter-regional flows, transportation, consumption, production and permitted reserves of primary aggregates. Contained data are usually supplied from official sources (e.g. planning authorities) and operating companies and should be regularly updated. Units of measurements are tonnes. Value should be provided for imports/exports and sales. The surveys are used to inform the authorities on the production, movement and

consumption of primary aggregates in order to monitor and revise the aggregates guidelines and to monitor and develop planning policies for the managed supple of primary aggregates in each country/region.

3.4.5 Compile and annually update a directory of active and inactive (but with a valid planning permission) aggregate quarries

A database of active and inactive quarries should hold information on:

- Status of the quarry (active or inactive)
- name of the quarry
- geographic location (coordinates)
- address
- operator
- geology (based on 1:50.000 geological map)
- production figures per product (tonnes)
- production capacity (tonnes)
- end-uses where known
- sales(tonnes) and sales' value
- expiry date of the permission
- total reserves
- remaining reserves
- production figures for the previous 3 years (apply to temporarily inactive quarries)

The database and its associated GIS can be used for many purposes and will provide a valuable tool for monitoring resource depletion.

3.4.6 Borrow pits

Small workings, sometimes called borrow pits, commonly associated with roads construction, forestry or agriculture, allow for the extraction of minerals near to or on the site of the associated development. Other than within the scope of permitted development rights, those workings will require planning permission in the normal way. The availability of primary aggregates generally, may overcome the need for such workings so applicants will need to demonstrate the particular operational, community or environmental benefits of such proposals. They should be time-limited consents, tied to the particular project and accompanied by full restoration

proposals". [Source: *Scottish Planning Policy SPP4 "Planning for Minerals", Scottish Executive, 2006* www.scotland.gov.uk/publications/2006/08/30152427/0].

3.4.7 Assess the impact of aggregates' transport from the extraction site to the consuming markets

A Transport Assessment, submitted in support of an application, should assist the planning authority in coming to a view on the development's transport impact. Aggregates used in construction, generally are transported no more than 50 km by road, before they become uneconomic, although higher value minerals may serve more distant markets. Where there are significant transport impacts on local communities full consideration should be given to the provision of routes which avoid settlements. Where rail, coastal or inland shipping are not viable alternatives to road haulage, the key issues are usually related to site access, vehicle control and monitoring under the conditions of the extraction site's planning permission.

Where feasible, new sites should be guided to locations close to markets thereby contributing to reducing energy consumption and pollution.

3.4.8 Specify compliance of aggregate resources with technical specifications

All aggregates (primary and secondary) must meet certain prescribed minimum standards if they are to be used in the construction sector. They should fit for purpose under an attestation of performance, or should comply with relevant national or EU standards. To ensure aggregates continually meet the required specification, and thus to ensure the end product is suitable for its intended use, a series of laboratory tests have been devised. A full list of the tests established by these new European standards are given below. The appropriate Standard document should be consulted if the full details of the tests and methods are required.

EN 932 Tests for general properties of aggregates
EN 933 Tests for geometrical properties of aggregates
EN 1097 Tests for mechanical and physical properties of aggregates
EN 1367 Tests for thermal and weathering properties of aggregates
EN 1744 Tests for chemical properties of aggregates

There are also European standards that specify the range of acceptable values under each test. Aggregates should fall within these ranges to be considered suitable for that use. The relevant standards are:

EN 12620 Aggregates for concrete
EN 13043 Aggregates for bituminous mixtures and surface treatments
EN 13055 Lightweight aggregates
EN 13139 Aggregates for mortar
EN 13242 Aggregates for unbound and hydraulically bound materials
EN 13383 Armour stone
EN 13450 Railway ballast.

3.4.9 Identify and apply the most appropriate methodology for demand forecasts

Aggregates demand is driven by activity in the construction industry and the economy as a whole. Demand forecasts play an important role in national and regional policy formulation and are used to determine medium and long term supply requirements. If a National/regional government has an idea of what will be the condition of aggregates demand in near future "it can formulate aggregates policy accordingly" and consider what proportion of the demand should be met by the key sources of supply. Different forecasting methods may be used including simple extrapolations based on historical trends, through to more sophisticated forecasts that are focused on construction based economic data and their interrelations.
The demand forecasting methods will be analysed further in the report to be produced under activity 4.2.

3.5 Data needs for secondary aggregate resources

It is a Government policy to reduce the contribution of aggregate supply from land-won sources by encouraging the wider use of alternatives, notably secondary aggregates. Secondary aggregates can help meet future aggregate demand and reduce the need for primary aggregates through re-using of material that would otherwise be clean filled or dumped. In particular, the use of recycled aggregates (R2) is increasing with a number of countries/regions promoting its uses through objectives and policies in plans. Where appropriate, planning authorities should identify appropriate locations for required waste management facilities, where possible allocating specific sites and provide a policy framework which facilitates the development of these facilities. In addition, they should collect data on the volume of recycled secondary resources that are sold as aggregates.

Several kinds of mineral by-products waste and residues can be effectively turned into secondary products through recycling. These products can be used in substitution of or in mix with natural aggregates (i.e. aggregates from mineral resources which have been subjected to nothing more than mechanical processing), for several end-uses, saving at the same time non renewable resources and scientifically reducing land take and subsequent environmental impacts.
Therefore the term "secondary aggregates" is used here to describe aggregates which originate as a waste of [other quarrying and] mining operations, or from industrial processes (e.g. colliery waste or mine stone, blast furnace slag, power station ash, china clay sand, slate waste, demolition/construction wastes including road planning's), but excluding chalk and clay/shale worked primarily for aggregate purposes. Sources of secondary aggregates have a strong regional character.

Four types of recycling activities are considered as potential sources of secondary aggregates and these are illustrated in table 3.1. [Source*: Sarma Manual "How to achieve aggregates resource efficiency in local communities*. http://www.sarmaproject.eu/].

R1:	Recycling of by-products, waste and residues from extractive activities
R2:	Recycling of Construction & Demolition Waste (C&DW)
R3	Recycling of excavated soils/rock from civil works
R4:	Recycling of industrial waste (e.g. slags from ferrous metal production, bottom ash from Municipal Solid Waste incineration, ashes from coal combustion

Table 3.1: Classification of recycling activities as potential sources for secondary aggregates production

3.5.1 Technical specifications

The same European standards that apply to primary aggregates (see section 3.4.8) also apply to the secondary aggregates resources. The standards are based on the aggregates fitness for purpose rather than the source.

3.5.2 Environmental impacts

Secondary aggregate resources processing activities, expansion to current sites and change of use of existing sites require planning permission and environmental permitting. Their processing produces dust, noise and may generate soil and water

pollution if not properly managed and their transport to the processing site and of products to construction sites also have environmental impacts associated with them, for example carbon emissions and noise. Before processing is applied, they are still classified as waste; therefore processing facilities operate under waste management regulations as applied in each country. [Source: http://www.sustainableaggregates.com/sourcesof aggregates/recycle/].

3.5.3 Volume per type of secondary resources (i.e. R1, R2, R3, R4)

The inert extractive or mining waste (R1) may become, after treatment, a potential aggregates resource. Since inert wastes may become aggregate resources, the compilation of dynamic inert waste lists can promote the development of integrated waste management schemes. Also, according to the criterion (d) of the Commission Decision 2009/359, mining waste is considered as being inert waste only if its content in heavy metals is sufficiently low and does not exceed "national threshold values for areas characterized as being non contaminated or relevant national natural background levels".

Construction & Demolition Waste (R2)) are generated during building and public infrastructure construction activities, buildings' and infrastructure demolition and road repair works. The specific waste stream was identified as a priority by the European Commission, since it constitutes one of the largest waste streams, representing almost 50% of the total waste produced in the European Union (EU). Currently, this type of waste is covered by the Directive 2008/98/EC on waste (that repelled the Directive 2006/12/EC). The recycling of C&DW is accomplished through permitted recycling facilities (fixed or mobile plants).

Industrial waste (R4) may originate from various industrial processes. Slag is a common industrial waste and is used both for the production of cement, but as aggregate as well.

3.5.4 % of secondary resources recycled

Calculations of the % of C&DW recycled are usually based on the quantities managed by the recycling facilities.

3.5.5 % of recycled used as aggregates replacing primary aggregates

Calculations of % C&DW recycled used as aggregates are usually based on the quantities sold.

3.6 Glossary of terms

Arranged below, in alphabetical order, are definitions of key terms used in this report. Most of the definitions referred to hereafter, if not otherwise stated, are based on the glossary developed within the SARMa project. The SARMa glossary was compiled after changing / adopting terms from the following glossaries:

BASIC: Glossary of terms IAEG;

1 : http://www.sustainableaggregates.com/glossary/glossary_abc.htm
2 : Chapter 7- glossary: http://www.concrete.org/general/fE1-99.PDF
3 : Terminology: http://www.aggregain.org.uk/...terminology
4 : EPA http://www.epa.gov/waste/conserve/tools/cpg/pdf/rtc/gloss.pdf
5 : http://www.brett.co.uk/page.aspx?pointerID=52210ED2293E43B6A61332CAD9D182D2
6 : Appendix 1: http://www.empr.gov.bc.ca/..../A-1_Glossary.pdf
7 : http://www.pavement.com/glossary/r.html
8 : http://www.biobased.org/glossary/
9 : http://www.geodiswilson.com/en/Global_tools/Logistics_Dictionary/V/
10 : http://www.wastedirectory.net/
11 : http://www.ruralresidentialliving.com.au/introduction/glossary.html
12 : Contaminated and Hazardous Waste Site Management
13 : http://www.businessdictionary.com/
14 : http://www.allbusiness.com/4967379-1.html?spi=profb&query=management
15 : http://dictionary.reference.com/
16 : http://glossary.eea.europa.eu/
17 : http://www.sourcewatch.org/index.php?title=Information_infrastructure
18 : http://stats.oecd.org/glossary/index.htm
19 : http://www.thefreedictionary.com/policy
20 : http://www.egreenideas.com/glossary.php?group=
21 : http://dictionary.babylon.com/
22 : http://www.goodquarry.com/glossary.aspx?mode=showaz&az_id=19
23 : Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain directives/
24 : Directive 2006/21/EC of the European Parliament and of the Council on the management of waste from extractive industries and amending Directive 2004/35/EC/
25 : http://www.teachmefinance.com/Scientific_Terms/I.html

26 : http://www.ecomii.com/dictionary/treatment
27 : Gunn, G and Paul Lusty: Meeting future global demand for minerals. British Geological Survey
28 : http://www.enotes.com/econ-encyclopedia
29 : https://www.ethicalfunds.com/en/Investor/ChangingTheWorld/AboutSRI/Pages/LearnTheLingo.aspx#s
30 : http://www.appl-ecosys.com/publications/social-license.pdf
31 : http://www.foe.org/financialsystem/FinancialReformProposals.pdf
32 : http://www.article13.com/csr/definitions-2.asp#Eco-efficiency
33 : http://www.unr.edu/mines/mlc/presentations_pub/Zyl_presentations/2000_palmSprings.pdf
34 : http://www.agof.de/glossary.194.en.html
35 : http://www.microinsuranceacademy.org/glossary
36 : http://lct.jrc.ec.europa.eu/glossary/

Aggregate

Aggregate granular or particulate material, either naturally occurring (sand and gravel) or produced by crushing (crushed rock) which, when brought together in a bound (with cement, lime or bitumen) or unbound condition, is used in construction to form part or whole of a building or civil engineering structure. Also referred to as 'construction aggregates' and used mainly as concrete, mortar, roadstone, asphalt or drainage courses, or for use as constructional fill or railway ballast.

Aggregate consumption [Source: *"Collation of the results of the 2009 aggregate minerals survey for England and Wales", Department for Communities and Local Government Welsh Assembly Government second edition October 2011*]

Apparent consumption is calculated from data on known sales within each region (or sub-region), plus known imports from other regions (or sub-regions) and, where appropriate, known imports from other countries. It is less that total consumption due to unallocated sales of unknown destination which, therefore, can not attributed to any consuming region (or sub-region). Further, some caution should be used in interpreting the consumption figures as they are calculated from the principal destination of aggregate flows.

Aggregate mineral survey [Source: www.bgs.ac.uk/planning4minerals/glossary.htm]

The Aggregate Mineral Survey is a voluntary survey of aggregate production and reserves undertaken every four years. The results of the survey are vital for monitoring and developing planning policy for the supply of aggregates.

Aggregate sales [Source: *"Collation of the results of the 2009 aggregate minerals survey for England and Wales", Department for Communities and Local Government Welsh Assembly Government second edition October 2011*]

The tonnage of mineral leaving a quarry as measured at a weighbridge.

Authority [Source: *Directive 2001/42/EC, article 2, paragraph 3.12]*

The concept of an "authority" has been given a large scope in the case law of the ECJ. It can be defined as a body, whatever its legal form and regardless of the extent (national, regional or local) of its powers, which have been made responsible, pursuant to a measure adopted by the State, for providing a public service under the control of the State, and it has for that purpose special powers beyond those which result from the normal rules applicable in relations between individuals.

Borrow pits [Source: *"Collation of the results of the 2009 aggregate minerals survey for England and Wales", Department for Communities and Local Government Welsh Assembly Government second edition October 2011*]

A site for the extraction of aggregates over a limited period, for exclusive use in a specific construction project, which will usually be close to or contiguous with the site.

Development plan [Source: *Scottish Planning Policy SPP4 "Planning for Minerals", Scottish Executive, 2006* www.scotland.gov.uk/publications/2006/08/30152427]

Development plans identify the demographic, economic, environmental and social needs of the area and set out a long-term strategy to address them. For minerals, the key strategic aim is to provide policies and land allocations that do not prevent mineral working yet accommodate community and environmental interests. Strategic Environmental Assessment (SEA) of development plans will ensure that the environmental consequences of the development strategy are rigorously examined.

Extractive waste (or mining waste)

Waste resulting from the prospecting, extraction, treatment and storage of mineral resources and the working of quarries.

Landbank [Source:http://www.bgs.ac.uk/planning4minerals/Glossary.htm]
A stock of planning permissions for reserves that ensure continuity of production for a set number of years.

Land use planning
An activity, generally conducted by a local government that provides public and private land use recommendations consistent with community policies and public preferences. Generally is used to guide decisions on zoning.

Manufactured aggregate
Aggregate produced from industrial activities as processing or re-processing of waste, by-products and residues.

Mineral Planning Authority (MPA) [Source: http://www.bgs.ac.uk/planning4minerals/Glossary.htm]

The planning authority responsible for planning control of minerals development. The mineral planning authorities are the statutory bodies (county councils, metropolitan borough councils, national park authorities, etc.) which control mineral workings in their areas. They are given guidelines by the government in the form of national and regional strategies and guides.

Mineral resources [Source: http://www.bgs.ac.uk/planning4minerals/Resources_4.htm]

Are defined as natural concentrations of minerals or, in the case of aggregates, bodies of rock that are, or may become, of potential economic interest due to their inherent properties (for example the high crushing strength of a rock or its suitability for use as an aggregate). The mineral will also be present in sufficient quantity to make it of intrinsic economic interest.

Mineral reserve [Source:http://www.bgs.ac.uk/planning4minerals/Resources_5.htm]
Mineral reserve is the part of a mineral resource, which has been fully evaluated and is deemed commercially viable to work and has a valid planning permission for extraction. Reserves will need to meet not only the requirements of geological certainty and economic viability but also accessibility based on legal permission to extract the mineral. Therefore, in the context of land-use planning, the term mineral reserve should be further restricted to those minerals with legal access and for which a valid planning permission for extraction also exists (i.e. **permitted reserves**). Aggregate reserves are of crucial importance to the planning process in ensuring that

an adequate and steady supply of aggregate is available to meet society's future needs.

Natural aggregate
Aggregate from mineral resources which has been subjected to nothing more than mechanical processing.

Permitted reserves [Source: http://www.bgs.ac.uk/planning4minerals/glossary.htm]

Mineral deposits with the benefit of planning permission for extraction.

Planning conditions [Source: www.bgs.ac.uk/planning4minerals/glossary.htm]

Requirements attached to a planning permission to limit or direct the manner in which a development is carried out

Planning permission [Source:http://www.bgs.ac.uk/planning4minerals/glossary.htm]

Formal approval sought from a council, often granted with conditions, allowing a proposed development to proceed. Permission may be sought in principle through outline plans, or be sought in detail through full plans.

Primary aggregates [Source:http://www.bgs.ac.uk/planning4minerals/glossary.htm]

Produced from naturally–occurring mineral deposits, extracted specifically for use as aggregate.

Recycled aggregates
Aggregates obtained from recycling of construction and demolition waste. The "% Recycled" is calculated as the % of available C&D materials that are suitable for recycling.
1 – Aggregate derived from both construction wastes, for example damaged bricks, and demolition waste, such as broken concrete, brickwork and masonry.
2 – Aggregate resulting from the processing of inorganic material previously used in construction.

Reserves
The quantity of a mineral commodity found in subsurface resources, which are both known as profitable to exploit with existing technology, prices and other conditions.

Resources
A concentration of a mineral commodity of which the location, grade, quality and quantity are known or estimated from specific geologic evidence.

Resource efficiency
A practice in which the primary consideration of material use begins with the concept of "Reduce - Reuse - Recycle - Repair" stated in descending order of priority.

Sustainable Aggregate Resource Management (SARM)

SARM is efficient and low socio-environmental impact quarrying and waste management throughout the quarry life-cycle. SARM is directly related to quarrying. In this sense potential secondary aggregate resources are not included.

Sustainable Supply Mix (SSM)

SSM means that aggregates' demand should be fulfilled with a mix of primary and secondary aggregates that together maximize net benefits of aggregates supply across generations.

Secondary aggregates
Aggregate which originates as a waste of other quarrying and mining operations, or from industrial processes (e.g. colliery waste or mine stone, blast furnace slag, power station ash, china clay sand, slate waste, demolition/construction wastes including road planning), but excluding chalk and clay/shale worked primarily for aggregate purposes.

Spatial planning [Source:http://www.bgs.ac.uk/planning4minerals/glossary.htm]

Spatial planning goes beyond traditional land-use planning to bring together and integrate policies for the development and use of land with other policies and programmes which influence the nature of places and how they function. That will include policies which can impact on land use, for example by influencing the demands on, or needs for, development, but which are not capable of being delivered solely or mainly through the granting or refusal of planning permission and which may be implemented by other means.

Strategic Environmental Assessment
[Source:http://www.bgs.ac.uk/planning4minerals/Glossary.htm)]
An environmental assessment of certain plans and programmes, including those in the field of planning and land use, which complies with the EU Directive 2001/42/EC. The environmental assessment involves the: preparation of an environmental report; carrying out of consultations; taking into account of the environmental report and the

results of the consultations in decision making; provision of information when the plan or programme is adopted; and showing that the results of the environment assessment have been taken into account.

Supply

Total amount of a product (good or service) available for purchase at any specified price. It is determined by: price, cost of inputs, and the price of other goods, and other variables.

Sustainable development

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Waste

Waste refers to materials that are not prime products (that is, products produced for the market) for which the generator has no further use in terms of his/her own purposes of production, transformation or consumption, and of which he/she wants to dispose.

4 THE CURRENT SITUATION IN SEE REGION

Aggregates' planning is accomplished at national or regional/local level, depending on the rate of decentralisation of each country but generally the planning process, concerning aggregate resources management and supply (SARM), is immature to varying degrees in many SEE countries/regions. The crucial of a SARM policy is data management. Without proper data and statistics a realistic SARM policy framework cannot be applied.

In addition, the issues related to primary aggregates in most SEE countries, are at the moment managed separately, from those related to secondary resources, which make planning for SSM very challenging. Application of SSM policies means that aggregates' demand should be fulfilled with a mix of primary and secondary aggregates that together maximize net benefits of aggregates supply across generations. SSM planning is related to the planning / development process by the respective stakeholders/authorities using these multiple sources in order to secure a sustainable supply of aggregates. All of the concerned stakeholders, e.g., those responsible for land use planning or for regulating the planning process of recycled aggregates and the sustainable use of natural resources, should act in close cooperation. The SSM planning framework provides 'basic operation rules' for the primary and secondary aggregates industry.

4.1 Data availability in SEE region

Regarding the availability of data, most SEE countries/regions hold archives and maps on the distribution of primary aggregate resources and permitted reserves, on the location of extraction sites, on the quality per field of application (e.g, chemical and mineralogical analysis, particle size analysis, physical and mechanical properties according to technical standards) and on production. Estimated demand forecasts data and data on aggregate consumption are only available in few countries. Most of the data are stored in digital databases and maps in the majority of the surveyed SEE countries (Fig. 4.2).

The basic geological information regarding distribution of primary aggregate resources (e.g. geological maps of 1:50.000 to 1:100.000 scales, location maps of

extractive and abandoned sites, lithologies, a broad assessment of the quality of the resources, e.t.c.) are usually provided by the country's national geological survey.

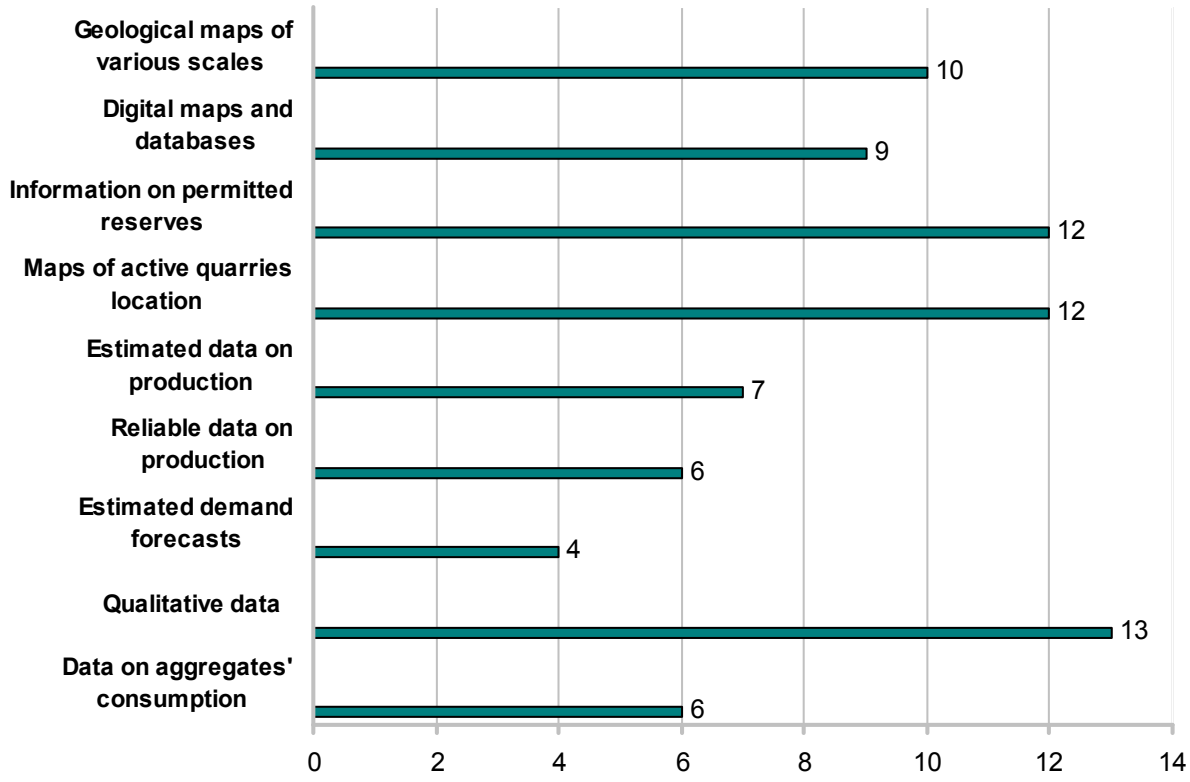

Fig. 4.2: Availability of data per data category in 13 South East European (SEE) countries or regions

Data on permitted reserves, production and production capacity of the quarry operations, quality (according to specifications regarding fields of application), sales and sales' value of aggregate products, are provided by the quarry operators (usually on a yearly basis) and collected/evaluated by the competent ministries (and/or regional authorities) in charge to authorize and control the activities of the mining/quarrying sector in each SEE country/region. Statistical reports regarding historic production, consumption, needs and trends in future supply and demand, are usually carried out by the competent Ministry (ies) in each country (e.g. Ministry of Economy, Ministry of Environment, Ministry of Mining and Spatial Planning, Ministry of Transport) and Offices for National Statistics Service.

Data, regarding produced volumes of secondary resources and on the % of secondary resources recycled, when available, are mostly estimated. In addition,

data on % of recycled of secondary resources used as aggregates are practically absent, with the exception of one or two countries/regions (Table 4.2).

Country/Region	Data on production volumes per type (tonnes)					
	R1	**R2**	**R3**	**R4**	**Data on % of secondary resources recycled**	**Data on % of recycled used as aggregates**
Albania	Estimated	NO	NO	Estimated	NO	NO
Austria	Estimated	YES	NO	YES	YES (R2) YES (R4)	NO
Croatia	Estimated	Estimated	Estimated	Estimated	NO	NO
Emilia Romagna	YES	YES	NO	YES	YES	NO
Greece	NO	Estimated	NO	Estimated	NO	NO
Herzegbosnian Canton	NO	NO	NO	NO	NO	NO
Hungary	Estimated	Estimated	NO	Estimated	YES	NO
Montenegro	Estimated	NO	NO	Estimated	NO	NO
Romania	Estimated	NO	NO	Estimated	NO	NO
Serbia	Estimated	NO	NO	Estimated	YES (R1) NO (R4)	YES (R1) NO (R4)
Slovakia	Estimated	Estimated	NO	Estimated	NO(R1) YES (R2) YES(R4)	NO
Slovenia	Estimated	YES	NO	Estimated	YES(R1) YES(R2) NO (R4)	NO
Trento	Estimated	YES	Estimated	YES	NO (R1) YES (R2) NO (R3) YES (R4)	YES (R2)

Table 4.2: Availability of data on secondary aggregate resources in the South East European (SEE) countries (see table 3.1 for definitions of R1, R2, R3, R4)

Here it should be noted that, secondary resources are not considered in planning for aggregates supply in most SEE countries and therefore databases on secondary resources are either missing or contain limited and often not reliable information. The recycling rate of C&DW is very low in most SEE countries.

The data are available on regional and national level, depending mainly on which level the aggregates planning is performed, the category of data collected and the level at which the authority, which is responsible to authorize the extracting activities, is established, in each country.

The aggregate resource inventories are not equally developed in SEE countries, the data contained may not be regularly updated or kept in digital form, may derive from different sources and thus not being always compatible and easily traceable, may be not regularly crosschecked thus raising reliability issues and in most countries, existing inventories do not include data on secondary resources.

5 REFERENCES

http://www.bgs.ac.uk/planning4minerals/Glossary.htm
http://www.bgs.ac.uk/planning4minerals/Resources_4.htm

http://www.bgs.ac.uk/planning4minerals/Resources_5.htm
http://www.en.bmwfw.gv.at/Energy/Seiten/TheAustrianMineralResourcesPlan.aspx

http://www.sustainableaggregates.com/sourcesof aggregates/recycle/]

www.unep.org/ieacp/iea/

www.scotland.gov.uk/publications/2010/02/03132605/12

www.scotland.gov.uk/publications/2006/08/30152427/0

SEA Directive 2001/42/EC "on the assessment of effects of certain plans and programmes on the environment

http://www.sarmaproject.eu/

http://www.bgs.ac.uk/planning4minerals/Glossary.htm

Chalkiopoulou, F. & Hatzilazaridou, K. (2011). How to achieve aggregates resource efficiency in local communities, a joint manual, for stakeholders' decision making on the local level, SARMa (SARMa SEE/A/151/2.4/X), http://www.sarmaproject.eu

Chalkiopoulou, F., *etal.* (2013). The potential and perspectives to promote and develop policies in order to achieve sustainable aggregates planning in Greece (SNAP-GREECE), paper published in the proceedings of the SDIMI Congress 2013, Milos Island, Greece, 30/6/2013

Hatzilazaridou, K.,Chalkiopoulou, F., Shields, D. (2013). Sustainable aggregates resources management and planning issues in South East Europe: From SARMa to SNAP-SEE project, paper published in the proceedings of the SDIMI Congress 2013, Milos Island, Greece, 30/6/2013