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and co-ordination

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Social sciences in PLUEL

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Abstract

This is the first cross-cutting paper as part of the social science coordination of the PLUREL project. It looks at the way the social sciences permeate PLUREL and how the different approaches are used at different levels. It firstly introduces and briefly describes the different branches of the social sciences which have relevance to PLUREL for the information of those partners who are not familiar with social sciences. Following this some aspects of social science research methods are presented. After this the place of social sciences within each module is considered and then the interconnections are discussed. It proposes important needs for and integration between modules and work packages and for quality control.

1. Introduction

As noted in the introduction to the project, PLUREL will develop new strategies and planning and forecasting tools that are essential for developing sustainable rural-urban land use relationships. These strategies and tools, generic in nature, will support the analysis of urbanisation trends in the EU so that ways can be identified of both supporting this process and mitigating its negative impacts. In this way the PLUREL tools will help improve the quality of life of the population living in cities as well as in the peri-urban and rural surroundings. PLUREL will evaluate costs for the implementation of these strategies, and help stakeholders better to understand, plan and forecast the interactions between urban, peri-urban and rural areas.

Although ostensibly about land use change at the urban, peri-urban and rural interface in European city regions, PLUREL examines the processes at work that cause these land use changes. It also aims to engage with stakeholders and to improve the lives of the population living in cities. This means that people are involved and thus a lot of social processes. In fact, the processes that lead to land use change are mainly social or economic in nature; even environmental processes such as climate change are understood to be driven by human action and therefore susceptible to some degree of social science-based analysis. Thus, in order to understand how land use change occurs it is necessary to understand how people behave and interact with one another and the environment at many different levels.

This means that at one level everything is potentially understandable through an analysis of human behaviour – as individuals, as social groups at different scales or as populations. Therefore, in PLUREL there are two social science aspects to consider. The first is social science as a discipline and its use to understand how the processes of urbanisation are affected by human actions in a range of ways. The second is the use of social-science based methods in key areas of PLUREL. The cross-cutting aspect of this paper is to look at the way both aspects run through the project.

The paper will commence with a brief overview of sociology and the social sciences followed by an introduction to social science methods before discussing these in relation to each module of the project. Finally the inter-linkages will be discussed.

2. Sociology and the social sciences – a brief overview

In this section the main branches of the social sciences will briefly be introduced in order to place in context the roles of the subjects within PLUREL. These are not intended as deep and definitive descriptions. The main fields under discussion are sociology, environment psychology, cultural geography and political science. Economics is also considered to be a social science but since there is a separate economics coordination task in PLUREL it is not discussed further here, although some interactions with economics will be noted later in the paper. There are also other branches but these are not generally to be found in PLUREL, for example anthropology, education, social work etc.

2.1 Sociology

Sociology is the study of society and social action. It is carried out by examining the groups and social institutions people form, as well as various social, religious, political, and business organizations. Sociology also examines the social interactions of people and groups, traces the origin and growth of social processes, and analyzes the influence of group activities on individual members and vice versa. The results of sociological research can be used to help many areas such as the development of public policy, education, administration, law and the resolution of social problems as well as market research and advertising.

Sociology can cover different levels of areas of society such as:

- Macro-structures and processes that organize or affect society, such as, but not limited to, race or ethnicity, gender, globalization, and social class stratification.
- Institutions such as the family and social processes that represent deviation from, or the breakdown of, social structures, including crime and divorce.
- Micro-processes such as interpersonal interactions and the socialization of individuals.
- The effect of social traits such as sex, age, or race on a person's daily life.

Not all of these are relevant to PLUREL but, as will become clear, several key areas are very important for the project.

Sociological research aims to understand the social world in its many forms. Quantitative methods and qualitative methods are two main types of sociological research methods (see later section). Quantitative methods, such as social statistics or network analysis can be used to investigate the structure of a social process or describe patterns in social relationships. Qualitative methods, such as focused interviews, group discussions and ethnographic methods are also used to investigate social processes. Applied research methods such as evaluation research and assessment are yet other approaches.

2.2 Environmental psychology

Environmental psychology is an interdisciplinary field focused on the interplay between humans and their surroundings. Individuals change their environment and their experiences and behaviour are also shaped by their environments. This multidisciplinary field draws on work in a number of disciplines including anthropology, cultural geography, sociology, psychology, history, political science, planning, architecture, urban design, landscape architecture and aesthetics.

Given its interdisciplinary focus, Environmental Psychology has practical implications in different fields. Theory, research and practice in this discipline are aimed to improve people's quality of life and psychological well-being. There is therefore a constant concern in using information based on empirical research to guide environmental design.

Several key areas within Environmental Psychology are important for the PLUREL project:

- Examination of people's perceptions and preferences for the surrounding environment
- Understanding environmental attributes which either hinder or facilitates people's use of the environment
- Examination of the link between health and natural environments; that is, the investigation of how having access to nature can improve human physical and psychological health
- Resource management at the microlevel – based on the behaviour of individuals

Environmental Psychology makes use of diverse theories and research methods to approach its problems. Quantitative and qualitative research methods are used consistently to account for the diverse processes underlying people's interactions with their environments. Most often, design recommendations based on research findings are proposed denoting the preoccupation with the improvement of people's environment.

2.3 Cultural geography

Cultural geography is a sub-field within human geography. It is the study of cultural products and processes in relation to spaces and places. It focuses on describing and analysing many aspects such as the ways language, religion, economy, government, and other cultural phenomena vary or remain constant from one place to another and on explaining how humans function spatially at a range of scales from the local upwards.

Cultural geography looks for alternative readings of the relationship of culture and landscape. Alternatives include the society and space debate; the concept of spatial divisions of labour; and the theory of uneven development. Cultural geography emphasises the role of landscapes in the constructions of identities and

meanings, highlighting in the process the ways in which landscapes are both constituted by, and legitimate social power relations.

The area of study of cultural geography is, thus, very broad. The following are a selection of topic areas:

- Globalization and cultural convergence.
- Westernization, Americanization, Islamisation and other processes.
- Theories of cultural hegemony or cultural assimilation via cultural imperialism.
- Differences in way of life encompassing ideas, attitudes, languages, practices, institutions, and structures of power and whole range of cultural practices in geographical areas.
- Study of cultural landscapes.
- Colonialism, post-colonialism, internationalism, immigration, emigration and ecotourism.
- Gender identities and symbols.
- National and heritage identities and their representation in tourism.

Research in the subject can use many of the social science methods focusing on a rather qualitative research approach. Methodologies used in cultural geography are thus diverse including ethnographic methods (i.e.interviews, participant observation, focus groups), content analysis and interpretation of texts and images as well as those that follow participatory approaches such as action research and finally those that are based on new technologies such as self-directed photographs, video diaries, weblogs and audio recordings.

2.4 Political science

Political science is a branch of social science that deals with the theory and practice of politics and the description and analysis of political systems and political behaviour. The subject has five main subfields: international relations, political theory, public policy and public administration, national politics, and comparative politics. Increasingly, research into political behaviour has used the scientific method to create an intellectual discipline based on the postulating of hypotheses followed by empirical verification and the inference of political trends, and of generalisations that explain individual and group political actions. Over the past generation, the discipline placed an increasing emphasis on relevance, or the use of new approaches and methodologies to solve political and social problems.

From this brief overview it is clear that all the areas discussed are integral to PLUREL. Land use change is the result of the behaviour of people acting as individuals, for example in a role as residents (deciding where to live), commuters (using and placing demands on transport), consumers (making demands on shopping facilities) or as voters (deciding on the city government) to name a few types. They may act in social groups with recognised roles or functions such as pressure groups in favour of protecting open land or in developing open land. They may also belong to social or demographic groups on

account of income, ethnicity, educational level age or gender where use of green space, demand for housing, services or transport vary considerably. At a higher level are populations, where the individual motives are lost in the statistics but where the behaviour of larger demographic groups is more easily seen even if the motivations may be hidden.

In PLUREL there is a lot of mention of demographic groups, of stakeholders, of actors, of tribes, of agents, of consumers and other terms – all of which are ways of categorising or describing how people have a role or function of mode of behaviour. The application and overlap of these terms, which originate in various disciplines, some from social science and others from elsewhere, will be discussed later in the paper.

3. Social science research: theory and methods

In this section the main approaches to social science research theory relevant to PLUREL and the main research methods are introduced.

3.1 Social science theories related to people and their living environment

Since PLUREL is concerned with land use change and with the effect of people on this as well as the effect of land use change on people, it is useful to consider the ways that people relate to the physical environment in which they live, work or recreate. Several theories are of particular interest, all generally emerging from environmental psychology. These are place, place attachment and affordances.

3.1.1 Place

In order to provide a theoretical structure for research the concept of “place” is extremely useful. This is commonly found in the literature as an effective means of linking people with the locations that provide the settings for life and work, with which they may identify themselves and to which they may be psychologically attached. Canter’s Theory of Place (Canter, 1977) has been applied in a number of projects looking at urban or rural communities and their social, economic and environmental interactions (Ward Thompson and Scott Myers, 2003, Ward Thompson et al, 2004, Bell, 2004). In such studies it becomes obvious that when people talk about their lives, for examples in interviews, the physical environment of the place where they live, the activities they undertake, such as work, recreation, social activities, and the perceptions they have about themselves, their lives and the physical and social environment are all bound up together and are not viewed as separate elements. Thus, as an example of how these factors interact, people may wish to stay where they are living because the environment is attractive, there is a good social network and they identify themselves as belonging to that place but the lack of a satisfactory income is too strong a push factor and this leads to them regretfully to decide that they must leave and migrate elsewhere for work.

The Theory of Place is also useful because it enables research in this field to be structured around the three attributes (physical environment, activities and perceptions) and allows the researcher to disentangle the relationships amongst the attributes. When part of the research also concerns the physical environment (for example, the changing landscape of the urban fringe) the interactions between activities and perceptions with the landscape can also be explored. Thus, because whether and how much people value the landscape around them depends on how it affects the way they live, this can be identified in the data.

3.1.2 Place attachment

The meanings particular places hold for people who live in familiar surroundings, especially for a long time, are important for understanding their perceptions and activities during their lives. The places people live often acquire special

emotional significance which in turn creates attachment to that specific place. This is because people exist in particular spatial settings and the emotional connection to a physical location through the meaning given to the location through its role as a setting for experience. A range of thoughts, feelings, beliefs, attitudes and behaviour are evoked through attachment to place.

The concept of place attachment is complex, multifaceted and approached by researchers from many disciplines. Place attachment depends on interactions, beginning with the premise that all interaction is spatially located, so that place attachment occurs when a particular interaction is accompanied by significant meaning. There are two interdependent components for understanding the feelings a person experiences that binds them to a specific geographic location: the interactional past and the interactional potential of the place. Interactional past refers to the past experiences or memories associated with the place. The second component, interactional potential, is the imagined or anticipated future experiences or expectations associated with the site.

Place attachment has a special significance for older people. The connection between attachment to place and the unique developmental tasks that accompany the aging process such as maintaining a meaningful identity in light of age-related changes, protecting the self against deleterious adjustments due to later life, and maintaining a sense of continuity was emphasised.

3.1.3 Affordances

The notion of affordances is derived from Gibson's theory of perception. The affordance of anything is a specific combination of the properties, of its substance, and its surface taken with reference to an animal.

According to this theory, perceptual patterns provide information directly—without the help of much information processing. Perception is designed for action so people perceive possibilities for action in the environment (e.g., use of a park, place for living) which are called 'affordances'. To be able to detect the affordances of a place, one should consider the properties of the environment in relation to specific individuals. The person's personal intentions and capabilities need to be matched against the properties of the environment (e.g., stairs afford many ways of walking down).

The concept of affordances have been employed in different areas, such as children's environments; human development, artefact design; and urban design. One of the main contributions of Gibson's ecological approach is to set the focus on the environment at the same time that it conceptualizes an active individual—able to shape the affordances offered by the environment.

The affordances approach can help inform environmental design. Environmental support being understood as encompassing those properties can either facilitate or hinder action is easily linked to the notion of affordances. It is possible for researchers to analyse different settings, such as outdoor environments in relation to its sets of affordances to a specific group of people, let's say older individuals. By considering a specific group of people, researchers can detect a range of possible actions for these individuals which will happen in a specific setting or environmental context. This list of potential actions can be formulated

empirically and will provide a description of the affordances of the setting that supports these behavioural possibilities. In this sense, design solutions may have an effect of the quality of actualised affordances. The concept of affordances can play an important role to study “quality of life” in a more holistic way since it offers a framework which allows characterising environmental attributes in relation to the needs of an individual.

3.2 Social science research methodological theories

There are several theories that concern approaches to research, such as Facet Theory or Grounded Theory. Facet theory works closely in applying the Theory of Place but since it is not used in PLUREL it will not be considered further. Grounded Theory is at the heart of the approach used in Module 3 so will be introduced here.

Grounded Theory is a research method that operates almost in a reverse fashion to traditional research and at first may appear to be in contradiction of the scientific method. Rather than beginning by researching and developing a hypothesis, a variety of data collection methods are the first step. From the data collected from this first step through interviews, usually, transcribed and then able to be coded), the key points are marked with a series of **codes**, which are extracted from the text. The codes are grouped into similar **concepts**, in order to make them more workable. From these concepts **categories** are formed, which are the basis for the creation of a **theory**, or a reverse engineered hypothesis. This contradicts the traditional model of research, where the researcher chooses a theoretical framework, and only then applies this model to the studied phenomenon.

Critiques of grounded theory have focused on its status as theory (is what is produced really 'theory?'), on the notion of 'ground' (why is an idea of grounding the result important in qualitative inquiry?) and on the claim to use and develop inductive knowledge. With its quasi-scientific procedures, grounded theory seems to be aping the methods of the natural sciences and making claims to explanation and prediction that are unwarrantable in social science, according to the critics.

3.3 Social science research methods

Each of the social science disciplines introduced in Section 2 uses a range of approaches to the study of society - from the collection and analysis of statistics to the collation of responses to questionnaires and interviews. Like the other sciences, the social sciences evolve through the interplay of the ideas and theories of academics, and the evidence that supports or refutes them. The material for the following section is derived principally from the UK Cabinet Office (Magenta Book, Chapter 8).

There are two main branches of social science research: quantitative and qualitative. They may very often be used together and may also involve other approaches, so mixed-method research is very frequent in social science.

Some of the key differences between the two types of research are as follows:

- Qualitative research develops theories whereas quantitative tests theories as well as develops them
- Qualitative research describes meaning or discovery whereas quantitative research establishes relationship or causation
- In qualitative research the researcher is explicitly a part of the data gathering process whereas in quantitative research, the researcher is formally an independent entity.
- Qualitative research uses communication and observation whereas quantitative research uses instruments.
- Qualitative research uses unstructured data collection whereas quantitative research uses structured data collection
- In the social sciences, qualitative research focuses on how individuals and groups view and understand the world and construct meaning out of their experiences.
- Qualitative research methods are sometimes used together with quantitative research methods to gain deeper understanding of the causes of social phenomena, or to help generate questions for further research.
- Unlike quantitative methods, qualitative research methods place little importance on developing statistically valid samples, or on searching for statistical support for hypotheses.
- Instead, qualitative research focuses on the understanding of research phenomena in situ, within their naturally-occurring context(s).

There are some key areas in PLUREL where each type is especially important: the stakeholder interviews in Module 3 and the conjoint study in Module 4. These will be discussed in more detail later in the paper.

3.3.1 Quantitative research methods

As the name suggests, quantitative research in the social sciences involves collecting and analysing numerical data about people, their activities, their perceptions, opinions, preferences or other social variables and relating these to aspects about them and the population at large at whatever scale of resolution (local, regional, national or stratified by gender, ethnicity, social class etc). While demographic variables can be measured and analysed in terms of the proportion of the population belonging to this or that group, for example, because the more perceptual aspects cannot be measured directly, quasi-numerical techniques often have to be used, such as numerical scales representing a range of opinions.

There are two main ways of collecting data on people – to ask them or to observe them. In PLUREL most of the quantitative aspects use existing data from census etc but there will also be a special study using a technique called conjoint analysis (see below and the section on Module 4)

Census data is generally collected and analysed statistically on the basis of people belonging to different categories in binary way – they either belong or they do not belong – they are British or not-British, male or female etc or they fit a predefined category of age within pre-defined classes. This method of data collection enables straightforward analysis as well as more complex uses of the data to group people in different ways depending on different combinations of the data categories,

such as ethnicity and age and gender and residential location. Census data collected over different periods using the same classes enables longitudinal analysis, trend prediction and other valuable planning or policy data to be calculated.

Other quantitative research may involve samples of the population and be carried out to study a specific question, involve certain social groups or both. It may be small-scale or large-scale in terms of the size of the sample or the geographic area it covers; it may be a one-off survey or part of a repeated study (longitudinal). Comparative studies may also be made using the same survey instrument in different locations, regions or countries. Whatever approach, collecting social information usually

Questionnaires

These are a popular way of collecting data using a variety of random, representative, stratified or selective samples of the population (or in the case of the population census 100% of the population), depending on the purpose and the need for representativeness, such as a sample which contains the same proportions of age, ethnicity and gender as the population as a whole. Questionnaires can be applied using many techniques such as face to face interviews, postal surveys, telephone surveys and, increasingly, the internet. Each has its pros and cons in terms of the trade-offs of sample size, response rate, cost and efficiency.

Analysis of questionnaire data using statistical methods involves the use of software such as SPSS (Statistical Package for Social Science). Factor analysis, tests of reliability and significance such as the Mann-Whitney U or the Kruskal-Wallis tests as well as regression analysis are some of the common techniques used. Questionnaires usually collect a set of demographic variables and then use one of several techniques for asking questions about the subject under investigation. These can include open or closed questions or involve the use of statements with which the respondent is asked to agree or disagree using a scale

Conjoint analysis

Conjoint analysis, also called multi-attribute compositional models or stated preference analysis, is a statistical technique that originated in mathematical psychology. Today it is used in many of the social sciences and applied sciences including marketing, product management, and operations research.

Conjoint analysis requires research participants to make a series of trade-offs. Analysis of these trade-offs will reveal the relative importance of component attributes. To improve the predictive ability of this analysis, research participants should be grouped into similar segments based on objectives, values and/or other factors.

The exercise can be administered to survey respondents in a number of different ways. Traditionally it is administered as a ranking exercise and sometimes as a rating exercise (where the respondent awards each trade-off scenario a score indicating appeal).

In more recent years it has become common practice to present the trade-offs as a choice exercise (where the respondent simply chooses the most preferred alternative from a selection of competing alternatives - particularly common

when simulating consumer choices) or as a constant sum allocation exercise (particularly common in pharmaceutical market research, where physicians indicate likely shares of prescribing, and each alternative in the trade-off is the description a real or hypothetical therapy). Analysis is traditionally carried out with some form of multiple regression, but more recently the use of hierarchical Bayesian analysis has become widespread, enabling fairly robust statistical models of individual respondent decision behaviour to be developed.

The preferences explored in the process usually rely on a scale of some sort, such as a Likert scale, where the levels of agreement are converted to numbers such as 1-5 or 1-7 and which can subsequently be analysed numerically. See the section on Module 4 for more explanation of the context for this study.

3.3.2 Qualitative research methods

The key conceptual aspects concerning qualitative social science research are:

- A concern with meanings, especially the subjective meanings of participants;
- A commitment to viewing (and sometimes explaining) phenomena from the perspective of those being studied;
- An awareness and consideration of the researcher's role and perspective;
- Naturalistic inquiry in the 'real world' rather than in experimental or manipulated settings;
- A concern with micro-social processes (i.e. their manifestation at the level of individuals, groups or organisations);
- A mainly inductive rather than deductive analytical process (i.e. broadly, deriving theories or findings from empirical research data, rather than deducing a hypothesis a priori which is then tested by empirical research).
- Prolonged immersion in, or contact with, the research setting;
- The absence of methodological orthodoxy and the use of a flexible (emergent) research strategy;
- The use of non-standardised, semi-structured or unstructured methods of data collection which are sensitive to the social context of the study;
- The capture of data which are detailed, rich and complex;
- The collection and analysis of data that are mainly (although not exclusively) in the form of words and images rather than numbers.
- The setting of data in context;
- A commitment to retaining diversity and complexity in the analysis;
- A respect for the uniqueness of each case as well as themes and patterns across cases;
- Attention paid to categories and theories which emerge from data rather than sole reliance on a priori concepts and ideas;
- Explanations offered at the level of meaning (i.e. the individual and shared meanings that things hold for people) or in terms of local 'causality' (why certain interactions do or do not take place in individual cases) rather than context-free laws of general application.

One aim of the qualitative researcher is to tease out the meaning(s) the phenomena have for the actors or participants. This can also be done using quantitative methods or both approaches together.

There are three basic data gathering techniques:

- Participant observation
- Interview
- Social artefact content analysis (usually documents).

Participant observation research can include:

- Observing people using spaces – activities
- Observing which places they use for what activity
- Observing who uses different places for what activity.

Interview techniques can include:

- One-to-one interviews: a structured social interaction between a researcher and a subject who is identified as a potential source of information, in which the interviewer initiates and controls the exchange to obtain quantifiable and comparable information relevant to an emerging or previously stated hypothesis
- Focus group: allows an interviewer to study people in a more natural setting than a one-to-one interview. It can be used for gaining access to various cultural and social groups, selecting sites to study, sampling of such sites, and raising unexpected issues for exploration

Content analysis enables the researcher to include large amounts of textual information and systematically identify its properties, e.g. the frequencies of most used keywords (KWIC meaning "KeyWord In Context") by detecting the more important structures of its communication content

In-depth interviews (also called unstructured interviews) are probably the most frequently used form of qualitative research. Personal spoken accounts are seen as having central importance in social research because of their power to illuminate meaning. Individual, personal accounts display the language that people use, the emphases they give, and allow people to give explicit explanations for their actions and decisions. In-depth interviews are a fairly lengthy, focused and usually private type of interaction. As such, they provide an opportunity to collect rich and detailed data, with the research interviewer 'mining' the subject and encouraging the participant to give more and more depth to their responses. They are ideal for an in-depth exploration of a subject which gives the researcher a detailed insight into the participant's own world, and the explanations they provide for their own actions or beliefs. Interviews also lend themselves well to exploring complex processes or unpacking decision making.

The process of generating data through in-depth interviews is both systematic and flexible. It is systematic in that there needs to be careful and detailed thought initially about the type of data required and how to generate or collect it, and some consistency between interviews in the issues covered. However, data collection also needs to be flexible to reflect the uniqueness of each individual

case, to explore what is of particular relevance to it, and to allow the formulation of the research questions to develop and sharpen as the study proceeds.

A particular type of research also relevant to PLUREL is Action Research. Action research is a methodology for constructing knowledge through active engagement of the researcher with her/his social circumstances. Action research is distinguished from more traditional social science research methods by its attention to people, power and praxis. Central to action research is the concept of praxis: action and theory as an inseparable entity, practice informed by - and at the same time fashioning - theory. At the heart of action research is thus the idea of using research to change practice. By contrast with other quantitative and qualitative research approaches this change is not affected by perusal and adoption of research findings by practitioners and stakeholders, but by enabling the latter to develop their own, collective findings, as they engage critically with the problem at hand. The process of enquiry is shaped not only by the 'officially' designated researcher, but also by other participants in the enquiry process, people whom traditional approaches tended to view as research 'subjects'. A key characteristic of action research, by contrast, is that it is done **with** participants rather than **on** them. Both researcher and participant are actors in the investigative process, influencing the flow, interpreting the content, and sharing options for action.

This collaborative process aims at empowering its participants by (1) bringing them together to deal with common problems and needs; (2) validating their experiences as the foundation for understanding and critical reflection; action research is conducive to the latter. (3) presenting their knowledge and experiences as subjects for critical reflection, (4), contextualising their previously "personal," individual problems or weakness, and (5) linking personal experiences with political realities. These fuzzy processes of human interaction are better documented by qualitative research methods.

4. Social science in PLUREL modules

In this section the main elements of social science within the constituent modules and work packages of PLUREL will be reviewed

4.1 Overview of the project

PLUREL is divided into 6 modules and a plethora of work packages. It is structured on the principle of DPSIR: Drivers, Pressures, State, Impact and Response. The modules are as follows:

Module Title

Module 1 Driving forces and global trends International Institute for Applied Systems

Module 2 Land use relationships in rural-urban regions

Module 3 Governance and strategic planning scenarios (case studies)

Module 4 Sustainability Impact Assessment

Module 5 Instruments and tools

Module 6 Scientific management and coordination

4.2 Module 1 Driving forces and global trends

This Module forms the basis for the whole project, providing the other Modules with the global and European context within which the rest of the project operates. It develops quantitative scenarios and narrative storylines of alternative future trends in the development of the European-level driving forces of economy, demography, social dynamics, environment and technology.

The two driving forces of demography and social dynamics are within the field of social science. In this module it is recognised that demographic change is one of the main drivers of land use change and poses one of the big challenges to society. The work in PLUREL carried out by IASA in Vienna uses statistics on the range of demographic variables to evaluate the trends in relation to the scenarios being produced, also in Module 1. The work aims to use cutting edge methods to generate probabilistic projections, considered to be a major improvement over more usual techniques still employed by many agencies.

The work here takes data from census and other sources and uses statistical techniques to analyse it. The aim is to develop high quality data for use in the other modules, especially Module 2 (see below). Population trends, such as population ageing and increased immigration, are assessed along with factors of more local significance, especially patterns of internal migration and changes in land use. Trends in age structure, household size and composition, settlement pattern and local migration are also taken into account.

This work is at the “herder science” end of the social science spectrum in that it uses statistical techniques to analyse quantitative data from questionnaires (census forms

etc). However, since census data is collected only over intervals of 10 years problems arise when major demographic changes take place at times between census dates. A good example of this is the large-scale development of international migration that started when 15 countries joined the EU in 2004. The impact of this is visible on the streets of major cities and in the labour markets but does not appear strongly in the statistics yet, certainly not in time for the development of the probabilistic projections. This absence of data has repercussions for the development of the next phase which is planned to use such information on migration in Module 2.

4.3 Module 2 Land use relationships in rural-urban regions

To develop response functions and spatially-explicit reference frameworks to identify, assess and model land use relationships in rural-urban regions and to evaluate the demands placed upon rural, peri-urban and urban areas. Scenarios will be developed to project potential sustainable pathways and spatial strategies of rural-urban regions in different parts of Europe and serve as inputs to M5.

The tasks of M2 which involve the social sciences are, firstly, to study the planning policies and strategies for development of rural-urban regions of the EU-nations generally and in the urban case regions specifically and secondly to derive response functions to depict the rural - peri-urban - urban relationships from literature and empirically from case studies through examination and modelling the relationships between the sub-regions considering a set of pressures, resources and functions.

The typology of EU national governance and spatial planning systems provides a review of governance and spatial planning systems in the EU-nations with emphasis on urban development and peri-urban areas. As well a typology of legislation and the use of instruments with indirect effect on peri-urban land uses decision making roles and processes, participation strategies, and the roles of private and public sectors (e.g., partnerships) are given special attention. As well as desk study, this last item involves original qualitative data collection using interviews with relevant stakeholders (to be carried out as part of M3 – see below).

Response functions for population, household structure involve quantitatively describing the impact of the changing framing conditions calculated by M1 onto population and from that onto the household structure in the sub-regions of the generic types of rural-urban regions also produced in M2 as well as response functions for social issues: (semi)quantitatively describing the impact of changing framing conditions (M1) and that of population and household structure onto terms of aging, education, ethnic aspects and social equity of the population in the sub-regions of the generic types of rural-urban regions. These are based on a combination of sources: literature review of the issues and trends, drivers and other major factors affecting the subjects and from statistical analysis of data where this is available. Given the shortage of data on migration, for example, there are severe challenges to the production of response functions with the equal levels of confidence and it is expected that these will have to be more descriptive than quantitative. There is the possibility that some fresh data will emerge from the conjoint study being undertaken in M4 (see below).

4.4 Module 3 Governance and strategic planning scenarios (case studies)

The main aim of Module 3 is to identify strategies for sustainable management of land use relationships in rural-urban regions. The focus is on peri-urban areas where the dynamics of land use change and conflicts of interest among different actors are most varied and intense. The knowledge of planning practitioners and other stakeholders is being integrated into the research for sustainable land use planning and to reflect contextual differences between regions. Interdisciplinary research creates new knowledge by integrating experts from the humanities, social sciences and natural sciences. Trans-disciplinary research adds an extra level of integration by involving practitioners and other stakeholders. It provides a societal base for the PLUREL research. This is the module with the greatest amount of direct, applied and qualitative social science research.

The main elements of the research are a series of interviews with various stakeholders from the case study regions. As noted in the introduction to social science methods, the theoretical background to the research is grounded theory. This is organised for comparison purposes around a joint analytical framework which is developed by the partner research institutes involved in carrying out the stakeholder interviews and subsequent analysis. Owing to the differences in experience and capacity among the partners from different regions and countries great care is needed in refining the analytical framework so that the results from each will be comparable.

There is a risk in the exclusive use of qualitative methods that they are inevitably applied in different ways by different researchers (compared with quantitative methods where there is much more control for these differences by the use of standard survey instruments and data collection protocols) leading to difficulties in comparison of the results. The development of the joint analytical framework from a primarily descriptive document into an actual analytical method is needed and the way the process is managed, capacity building among partners achieved and quality control of the results to enable the transfer of the findings to the other modules needs careful thought if the results are to fulfil their potential.

4.5 Module 4: Sustainability Impact Assessment

The Objective of Module 4 is to assess the impacts of land use change based on specific land conversion scenarios both quantitatively and qualitatively and incorporated stakeholder behaviour in order to evaluate spatial policy strategies. Within the module several areas make use of the results of other social science outputs from other modules or involve social science approaches.

Examples of these are as follows:

- The derivation of a set of socio-demographic, economic and environmental indicators to assess regional scale land use-relationships at NUTS 2/3 level,
- Developing and applying agent based models using agent behaviour to model decision making using qualitative mapping and quantitative modelling approaches
- Deriving land use demands at local level that are mainly driven by individual (agent) behaviour,
- Relating socio-demographic, economic and environmental indicators into an integrative indicator matrix as landscape response functions of land use development

A large part of the work involves understanding how different human agents – whether residents, businesses, planners, pressure groups, utilities and so on- behave when decision making that affects land use, such as residential choice, business location, landscape protection etc. The response functions from M2, the stakeholder analysis from M3 and the development of indicators within M3 are all connected into a product chain leading to a set of indicators of which the socio/economic present some key challenges.

The agent-based modelling, while in one sense a technical programming exercise, relies on the description of plausible agent behaviour in order to model realistic scenarios.

The set of social indicators relies heavily on information on demographics from M1 and migration, ethnicity and ageing from M2 in order to follow through the connections between drivers, pressures, impacts, states and responses which form a cycle.

One of the main sets of social indicators concerns quality of life (QoL). **At a case-study regional level (Nuts 3 or Nuts X) quality of life is well represented by a combined indicator called residential choice. This is based on the idea that different factors affected by land use change combine in different ways to increase or decrease the quality of life for people living in a particular place. There is a threshold level of the decrease of these factors in different combinations which cause people to move house because their perceived quality of life has decreased too far (assuming they have the economic freedom to move, that is). However, people are not all alike and they have different perceptions of what factors are important for QoL. This can depend on their “lifestyle group” or “tribe” (a**

description based on their preferences for different things leading them to prefer different places to live, for example people who prefer the urban life of the city centre or those who want a quiet rural retreat) and their life-stage (people with young families may have different priorities to young singles or older retired people for example). Thus, at the level of the RUR, a simple and crude indicator applied to everyone will miss many subtleties about the way that the population will respond to land use change and its resulting effect on the living environment. Thus, in PLUREL a special approach is being used, based on a conjoint study. This is a special study being conducted in most if not all of the case study regions as well as some other regions and generally across Europe and is a major aspect of the application of social science methods within PLUREL.

5. Main issues to be considered for social science in PLUREL

This section reviews progress and proposes important needs for integration between modules and work packages and for quality control.

5.1 Interconnections between modules

In a project as complex as PLUREL where the organisation into modules and work packages represents as more an administrative tool than a representation of the scientific data flows the interrelationships between work from one module that feeds into another are extremely important.

The project is in one sense dominated by natural science and natural scientists with the social and economic sciences being less well-represented. Given the significant differences in paradigm that can exist between disciplinary realms such as ecology and sociology the need for stronger coordination is apparent, hence the appointment of a social science and an economic coordinator.

The recent development of project chains and task forces to enable the data flows to be more effective and to ensure that products from one module flow into the next leading towards the final product, be it the indicator framework or the SIAT-RUR should help in this as there was a point where there was a risk of communication breakdown and potential mismatch between what one module wanted and what another thought they were providing. Data requirements, for example to help the indicator development has posed problems when, for example stakeholders in M3 want to know what they should provide before M4 has been able to formulate its needs precisely enough or when M4 does not know what is available. All this can lead to confusion and frustration which the better communication through the task forces should go some way to solving.

5.2 Quality control

Owing in part to the different paradigms between the different research disciplines in PLUREL and the need for some modules to have reliable and consistent data from others the need to quality control is evident. When qualitative data derived using approaches such as grounded theory is to be made available for helping to model agent behaviour in the agent based modelling project, for example, it is important for the modellers to feel confident that the behaviour mirrors that of real actors. The challenge of the application of the joint analytic framework in different case study regions, the comparability of the data and the subsequent reliability for further purposes should not be underestimated.

One of the roles of the social science coordinator is to offer a sounding board and peer review of the emerging results of the analysis. Another role is to keep an eye on the big picture of the social science content of the project to ensure that the key product chains which involve the social aspects are coordinated, by being involved in the appropriate task forces.