European Journal of Geography Volume 7, Number 1:6 - 16, March 2016

FROM CONTENT TO CONCEPT. TEACHING GLOCAL ISSUES WITH GEOGRAPHICAL PRINCIPLES.

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Abstract

Glocal problems are central to school geography. Due to their complexity and as a result of the didactic reduction these issues are often taught too simple in geography classes. Instead, it is necessary to improve cumulative learning so that students are able to cope with more challenging problems. A useful strategy is to structure geography lessons on the basis of key concepts and subject-specific principles. Key concepts are basic explanations and guiding principles of professional thinking, which can be used in different geographical issues. These principles can be discovered by the students in various (new) glocal problems. This supports the development of a deeper geographical understanding through all grades. With reference to the work of natural science education, we try to identify such key concepts for glocal problems.

Keywords: *Glocal issues, Key Concepts, geographical principles, structuring geography lessons.*

1. INTRODUCTION

Buying a new smartphone seems to be a simple event. But looking at the broader processes like the production, trade and transportation reveals the complexity and interconnectedness of the processes behind the purchase itself. This starts with the variety of raw materials that is used or the production steps taking place in different regions of the world. But there are a lot more corresponding issues like ecological aspects (worldwide transportation, the pollution through ore mining), political phenomena (national trade restrictions for rare earth metals, competing players concerning the exploitation of resources) as well as social issues (occupational safety, child labor).

The variety of concerned topics, involved actors, spatial dimensions, and the interrelated processes show the complexity of these issues. This problem arises in a large number of glocal phenomena, such as climate change or global justice. This implies a challenge for geography-lessons. To cope with such issues is important for society in general and a central challenge for geography as a subject (cp. Ohl, 2013). At the same time, teachers convey a gap between acquired and required competencies concerning their capability to adequately capture these glocal problems, as Hof & Hennemann have stated in a study (cp. 2013, 78).

1.1 The Challenge: The Complexity of glocal problems

The glocal problems outlined above are to be characterised more extensively at this point. ‘Glocalisation’ characterises some of the most important current challenges like global trade, issues of equality, climate change or the consumption of resources. But what does that mean: ‘glocal’ or ‘glocalisation’? This portmanteau of local and global, localisation and globalisation

(cp. Robertson, 1995) was primarily used in strategic management. It describes, for example, the strategy of fast food companies that adapt their global strategy to local conditions ('think globally, act locally'). That is why their products vary depending on the geographical region. In this paper, we use 'glocalisation' to express the increasing complexity of the world. Therefore, the term 'glocalisation' covers the processes and changes that are taking place simultaneously at different levels of scale (Robertson, 1995). These processes are characterised by multidirectional interrelationships, by reciprocal effects between local and global conditions. When we deal with glocal issues, we are faced with highly differentiated systems with interdependent interrelations between its elements and structures (cp. Rempfler & Uphues, 2011, 38). In contrast to 'globalisation', the term "glocalisation" focuses on the factual complexity and emphasises multidirectional processes.

This complexity is relevant in everyday life. Individuals act within a local dimension. This results in effects on a global level. And at the same time, individuals are affected by global circumstances. These interactions are a central challenge in the context of glocal issues.

This can be illustrated again with the example mentioned above: buying a smartphone in a concrete shop has global implications concerning the production, trade etc. That shows that even the pupils' everyday life is embedded in a glocalised environment. This leads us to didactic consequences: pupils should be addressed as directly involved players and not as passive observers of abstract processes.

But as mentioned above, the complexity of glocal problems causes some challenges. First, it is difficult to prepare and structure these issues for geography lessons without extensive simplifications. Second these simplifications could lead to recommended actions that are oversimplified. For example the recommendation: "The purchase of regional products is always preferable, because their production is environmentally beneficial." The idea behind this suggestion is the environment pollution due to the import of food or comparable goods and as a result of transportation over a long distance. The above-mentioned recommendation is intuitive and seems correct. But it could be wrong. An example: A regionally produced apple, which is harvested in the fall and stored in refrigerated warehouses until someone buys this apple in summer, causes emission of carbon dioxide. Thus, this apple could have a worse eco-balance than an apple from New Zealand that is shipped to Europe without any further storage period (cp. Neubacher, 2012, 75). For this reason, it is important to empower students as active glocal protagonists to act locally and to consider the global consequences. The multifaceted complexity (different dimensions like the factual, social, temporal or spatial complexity) is a big challenge (Seitz, 2002).

2. KEY CONCEPTS AND PRINCIPLES

2.1 Key Concepts in natural science education

In natural science education, for instance in biology and chemistry, key concepts are used as a means for teachers and pupils to cope with complex issues (cp. Demuth, Ralle & Parchmann 2005; Lichtner, 2007, 2012). Key concepts are subject-specific ideas or analytical frameworks which give support in structuring lessons concerning complex issues. At the same time, they enable pupils to discover familiar patterns in new contexts.

For biology, key concepts were developed that cover the entire subject matter. They are called structure and function, reproduction, control and regulation, variability and appropriateness, etc. (a total of eight key concepts) (cp. Lichtner, 2012; Weber, 2008).

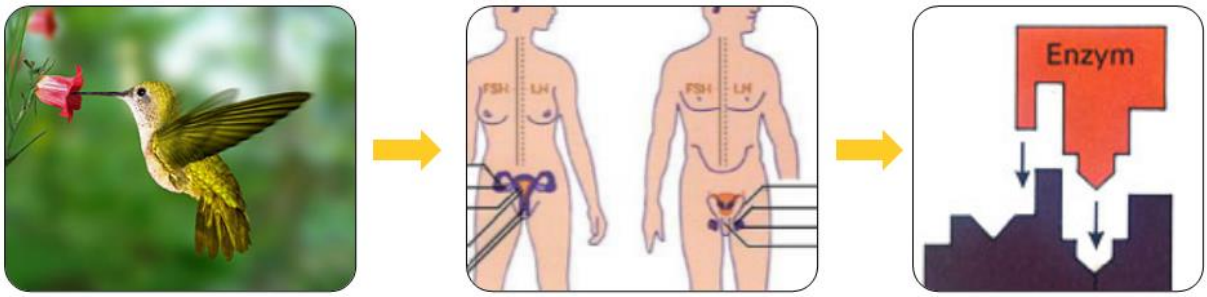


Figure 1. Lock-and-key-principle.

How these concepts are being used, can be illustrated on the key concept ‘structure and function’.

This concept covers the functional relation of the organisms’ structures and their functions within a specific system; for example the human knee and the ability to walk. Since the degree of abstraction of the underlying concept ‘structure and function’ is very high, concepts and principles at a lower level of abstraction were found- for example the lock-and-key-principle (see figure 1). In support of (learning-) progression, this principle occurs in different grade levels within various phenomena.

Using the lock-and-key-principle in lower grades supports pupils to build connections between structure and function, for example, they could analyse birds and their beaks which are adapted for collecting nectar from flowers. In a cumulative learning process, this principle is applied in increasingly complex subject areas. For example first on the basis of sexuality and sexual organs, and finally on the basis of the functioning of enzymes (see LICHTNER, 2012).

This example indicates the key concepts’ potential as reductive-organising strategies. Thus, key concepts and subject-specific principles could be a means to cope with highly complex and extensive topics (cp. Ohl, 2013, 7).

2.1.1 Definition: Key Concepts and principles

Key concepts can be defined as structured and interconnected ideas, theories and explanatory models that have emerged from the structure of a subject to describe subject-specific basic processes and phenomena (Demuth, Ralle & Parchmann, 2005, 57). While geographical units like cities, rivers, and vegetation zones are like the subject’s vocabulary, key concepts as the subject’s grammar are able to establish connections between these vocabularies (cp. Sander, 2007).

In understanding the function of key concepts we can distinguish between two perspectives. The first considers these concepts from a student or learner's perspective. Thus, the basic concepts can be understood as guiding principles ("big ideas") of professional thinking that are comprehensible to students and can help them to develop subject-specific knowledge and conceptual understanding (cp. Demuth, Ralle & Parchmann, 2005, 57).

The use of basic concepts supports the learner to recognise meaning and structure in the context of the given issue (cp. Lichtner, 2007, 1). From the learners’ perspective, key concepts are a metacognitive learning strategy. The often cited study of the educational researcher John Hattie (2009, 189), which examines the effectiveness of various teaching and learning activities notes a high learning effectiveness of such strategies.

A second perspective focuses on the teachers’ perspective and therefore emphasises challenges concerning their lesson planning. One of the first steps in this process that can be supported by using key concepts is to foster the professional understanding of the teachers.

With the aims of promoting a vertical integration of new knowledge (systematic knowledge-building) and to strengthen the horizontal expansion of knowledge, teachers plan and structure their lessons on the basis of key concepts (cp. Demuth, Ralle & Parchmann, 2005, 56). Key concepts initially serve as a kind of relevance filter, so they can help selecting and structuring subjects. By selecting appropriate examples, key questions can be found. (ibid, 59).

This perspective allows conclusions to their positive impact on the students' learning, too. Hattie noted in this regard that the teachers' deep understanding about their subject has a very large positive impact on student learning (cp. 2009, 117).

The example of biology has shown that subject-specific key concepts are often at a too high level of abstraction. Therefore, subject-specific principles have been worked out. These can each be assigned to the concepts. The principles are on a lower level of abstraction and have the same functions as the key concepts (Schmiemann et al., 2012, 107).

2.2 Geographical key concepts

2.2.1 Geographical Key Concepts in UK

For school geography, the first major catalogs of key concepts were developed in the English-speaking community. Table 1 (Taylor, 2008, 51) provides an overview of some crucial approaches. Starting point for these approaches were questions like: What does 'thinking geographically' mean (Jackson, 2006)? Which scientific interest do geographers have? What does it mean to ask geographically?

The following geographical concepts turn out to be central through the comparison of these collections of key concepts: place, space and scale (e.g. Holloway, Rice & Valentine, 2003; Jackson, 2006).

Place implies various facets such as the location and the materiality of a particular place and especially its meanings are very important (sense of place). Places may be fictitious or real and it is of great interest how they are perceived and represented by people, how places emerge through power geometries (Massey, 2005; Uhlenwinkel, 2013, 24).

Space as a geographical concept has been conceptualised in different ways, too (Lambert & Morgan, 2010, 69, Hubbard et al. 2002). From an absolute understanding of space as a container with three dimensions (x, y, z), as a system where "objects are located and events occur" (Curry, 1995, 5), space is more and more seen as a social experience. This view prioritises the question "of how space is constituted and given meaning through human endeavour" (Hubbard et al. 2002, 13).

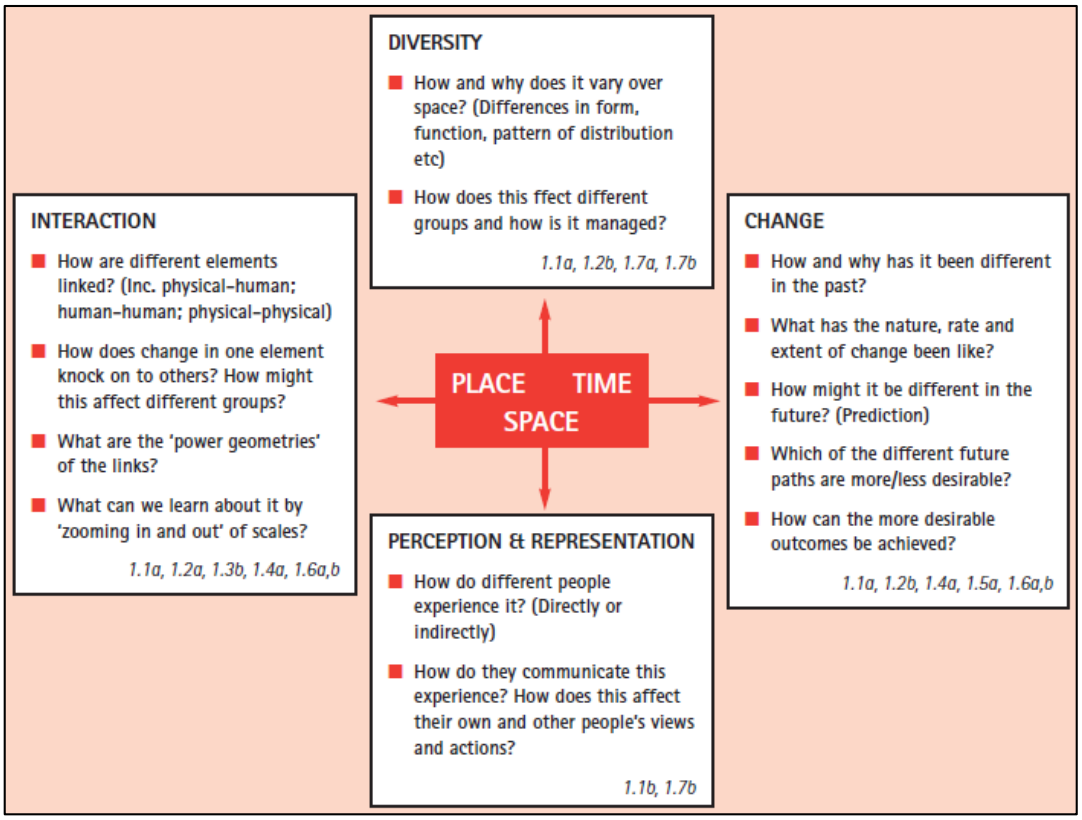
Table 1. Overview of different collections of geographical key concepts.

Leat (1998)	**Geography Advisors' and Inspectors' Network (2002)**	**Rowley & Lewis (2003)**
Cause and effect Classification Decision-Making Development Inequality Location Planning Systems	Bias Causation Change Conflict Development Distribution Futures Inequality Interdependence Landscape Scale Location Perception Region Environment Uncertainty	Describing and Classifying Diversity and Wilderness Patterns and Boundaries Places Maps and Communication Sacredness and Beauty
Holloway et al. (2003)	**Jackson (2006)**	**UK 2008 Key Stage 3 Curriculum (QCA 2007)**
Space Time Place Scale Social Formations Physical Systems Landscape and Environment	Space and place Scale and connection Proximity and distance Relational Thinking	Place Space Scale Interdependence Physical and human processes Environmental interaction and sustainable development Cultural understanding and diversity

Source: adopted from TAYLOR, 2008, 51.

The scale, on the other hand, was formerly dominated by a technical view on different scales. The following quotation is a product of this perception: "Everything is related to everything else, but near things are more related than distant things" (Tobler, 1970, 236). Having an increasingly globalised world in mind, in which local conditions are significantly influenced by events that take place in distant areas, illustrates that this view on the geographical concept scale has changed. Thus, interconnectedness and scale as an explanatory factor are becoming more important. Therefore, specific changes between different scale levels could be used as an enquiry method (cp. Uhlenwinkel, 2013, 21).

Since these concepts are on a high level of abstraction, some authors proposed concepts at a lower level of abstraction. A widely noticed approach is shown in Figure 2 where L. Taylor proposes four organising concepts: diversity, change, perception & representation and interaction (see Taylor 2008 for further explanations).



Source: TAYLOR, 2008, 52

Figure 2. Geographical *Concepts*, L. Taylor..

Taylor added concrete questions to each concept. This illustrates the potential of these concepts to support students in the acquisition of specific knowledge and insights.

2.2.2 Key Concepts in the German educational standards in geography

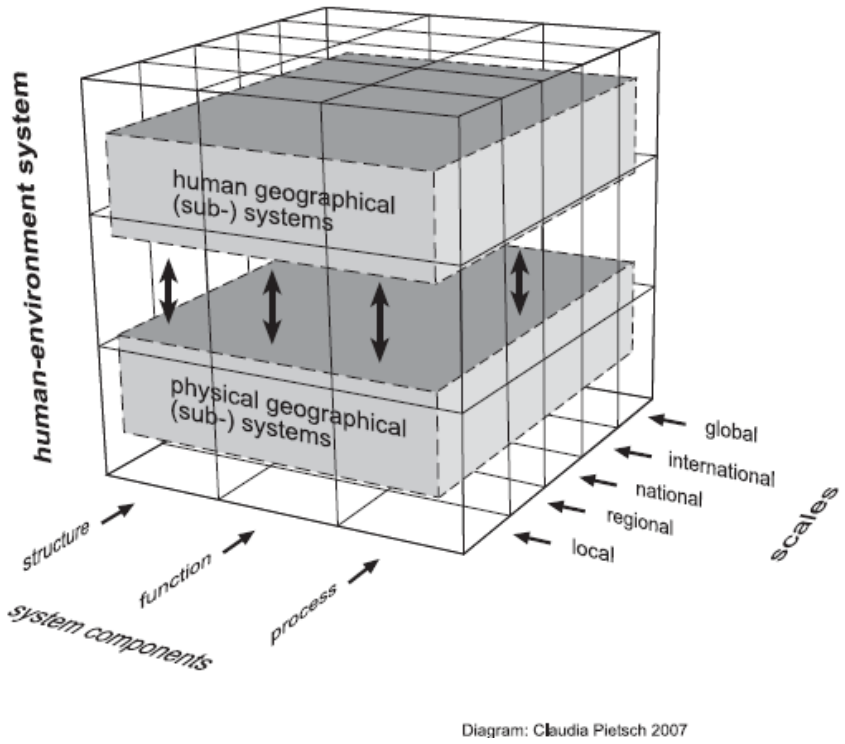
While there are already some first approaches within the didactics of geography to take up the approach of key concepts, the practical relevance in geography lessons, especially in the context of glocal issues, is still very low.

The German Educational Standards in Geography considers the system as the fundamental (basic) concept (German Geographical Society, 2012, 10). The interrelations between the physical and human geographical subsystems are one central object of study (ibid.) (see figure 3). Subordinate to the system as the basic concept are the components structure, function and process.

The spatial organisation of geographic factors such as human settlements or the relief form the structure of a system (ibid, 11). The interrelations between these elements constitute their functions (for example the relief to the vegetation). Continuous processes are transforming and changing the systems and their elements, for example within the orogenesis, urbanisation etc. These systems and their components are considered and explained at different scales, from a local to a global level.

The high level of abstraction of these concepts so far prevents a broad implementation in geography lessons. Thus, they are difficult to grasp both for learners and for teachers. Uhlenwinkel questions the benefit of a concept that contains all possible components, as proposed by this approach (2013, 23). A key concept - like the system - that covers every phenomenon, reproduces the complexity that is inherent to the considered issue. Thus, this

concept loses both its analytical benefit as well as its practical usability as a tool to plan and structure geography lessons.



Source: German Geographical Society, 2012, 11.

Figure 3. System as the basic concepts in the German educational standards in geography.

It is, therefore, desirable to identify feasible and manageable concepts and principles that may be helpful to address the challenges outlined above. Within this attempt, we focus on teaching geography in the context of glocal issues.

3. GEOGRAPHICAL PRINCIPLES FOR GLOCAL ISSUES

3.1 A collection of geographical principles

The very useful Anglophone and German concepts of the didactics of the natural sciences are being used as a basis to work out convenient concepts and principles to cope with glocal issues in geography lessons. The developed principles need to meet more demands. On the one hand, they need to have a level of abstraction which is feasible for teachers. For this reason, they need to be very concrete that they can help to decide on topics and to structure them. On the other hand, they need to represent subject-specific enquiry strategies to comprehend the analysed issue. Thus, the principles can lead to a profound understanding of the subject. It is also important that they are suitable for pupils to enable them to use the principles independently. Figure 4 shows four principles: enquiry on different scale levels, sustainability quadrangle, subjectivity & values, intergenerational perspectives. These principles are proposed to be useful to cope with glocal issues. There will be symbiotic teacher training courses (Gräsel & Parchmann, 2004) as a part of an academic study at the University of Erlangen-Nuremberg to

prove this assumption. The figure shows their derivation according to the above-mentioned concepts. The arrows indicate possible relations, in this case, the figure does not claim to be complete.

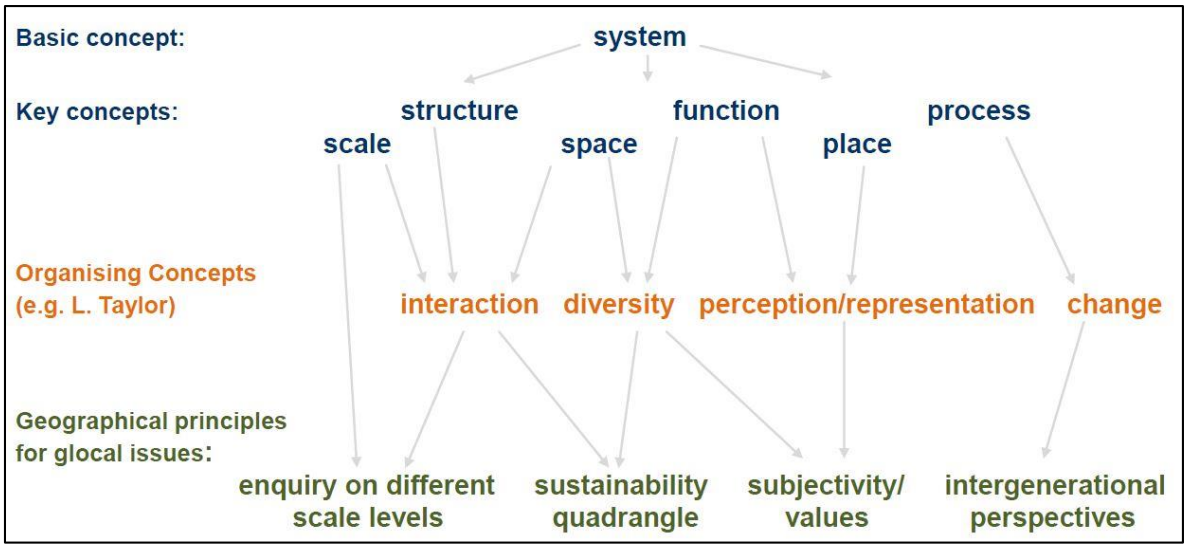


Figure 4. Derivation of geographical principles in the context of glocal issues.

Some brief considerations on the proposed principles can provide an idea for their conceptualisation.

- **Sustainability quadrangle:**

Analysing the four dimensions ecology, economy, politics, and good governance, as well as social issues, can be used as patterns to find out interdependencies and interactions that appear in the considered glocal issue (cp. Engelhard, Mönter & Otto, 2009, 7).

- **Enquiry on different scale levels:**

In association with the sustainability quadrangle, enquiries on different scale levels can be useful as a meta-cognitive strategy to analyse glocal issues. An intended focus on local, regional or even global scales and an intended change between those levels are very important geographical strategies.

Instead of looking at the scale levels in an additive and isolated way, it is intended to change the scales constantly (for example while looking at facets of the human-environment system or by referring to separate dimensions of the sustainability quadrangle). (Jahnke & Richter, 2010; Uphues, 2007, 158).

- **Subjectivity and Values:**

Conflicts and consensus, the identification of problems and solutions..: these central phenomena in the context of glocal issues depend on different standards of evaluation. These are results of particular values that vary concerning to individuals, groups, regions, certain points in time etc. The consideration and reflection of these issues are important to comprehend the scope of glocal problems.

- **Intergenerational perspectives:**

The intergenerational perspective is linked to the sustainability quadrangle and an important aspect of many glocal issues. This focus on conditions for several subjects allows detecting an aspect of justice and particular processes of change.

How to use these principles can be illustrated with the help of an example. Many German textbooks for geography are dealing with topics like the carbon footprint and renewable energies (eg. Brodengeier & Obermann, 2007). In this context one considered issue is biofuel. Several articles in journals of geographical education treat this controversial issue, too. These attempts are emphasising different topics like tropical deforestation (Ditter, 2008), nutrition security vs. climate protection (Sprave, 2007), land consumption (Sedelmeier, 2012) or on case studies concerning particular countries like Brazil (Schacht, 2008). Due to the complexity of this topic, it is difficult to cover every single detail. Key concepts and geographical principles can help to identify relevant facets systematically. They are a means for teachers and pupils to think and ask geographically, to select important information, to organise the enquiry on this complex issue.

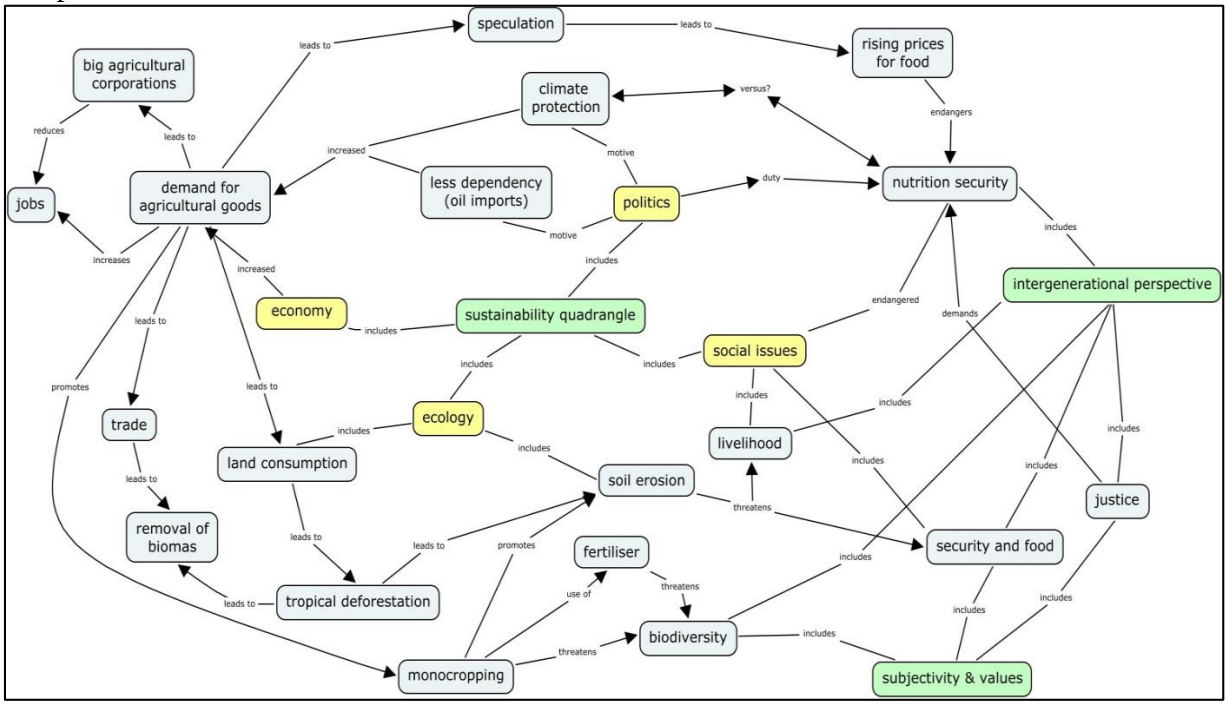


Figure 5. Using geographical principles, biofuels.

Figure 5 shows a possible intermediate result of an enquiry that is based on geographical concepts. Although there exist a lot more possible items and interrelations, this concept map covers many facets of the complex issue biofuels. Based on this illustration the enquiry could be continued with the help of the geographical principle different scale levels. The identified items can be examined by their spatial location and distribution, their range and their interconnectedness. By switching between different scale levels in addition to particular selected dimensions like economy and ecology (and their interdependencies) learners could gradually grasp this complex issue during their enquiry. Furthermore, this intermediate result

helps to identify geographical concepts on a higher level of abstraction. After getting access to central issues and questions with the help of geographical principles, organising concepts (see above) like change (increased demand for agricultural goods- land consumption- tropical deforestation- soil erosion) or interdependence (climate protection and nutrition security, see figure 5) can be derived from these first insights.

This is a brief demonstration how the introduced geographical principles can be used. There are a lot more facets, a lot more problems concerning biofuels. The example gives an idea of the advantage of the geographical principles- especially in comparison to the above-mentioned key concepts that are on a high level of abstraction. As within the proposed attempt, it is not necessary to consider every principle on every topic. Rather it is useful to focus on particular principles that occur on the examined issue.

4. CONCLUSIONS

Based on considerations on the importance of glocal problems and the challenge for school geography due to their complexity, key concepts, and geographical principles are a promising means to cope with these challenges. Using these strategies in the context of glocal issues can provide the support of deeper geographical understanding through all grades. Geographical principles are on a level of abstraction that enables teachers to structure their lessons, to select important issues. At the same time, pupils are capable, using them during their enquiries on their own. It is desirable getting insights in the feasibility for teachers of these geographical principles. These insights can be used for the implementation of this approach.

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