Part III
Synopsis and Outlook

13 Synopsis of Syndrome Contexts and Core Problems Associated with Syndromes of Global Change

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Abstract

The present chapter attempts to synthesise the outcomes of the eight JACS workshops described in the second part of this publication. Although the basis for comparison was somewhat limited owing to the methodological diversity of these workshops, a synthesis has been elaborated, using a four-step approach. First, the different syndrome contexts determined by the JACS workshops were contrasted with the original three syndrome contexts. This made it possible to determine which contexts are actually comparable. As a result, the highland-lowland context was divided into a "highland and mountain" context and a "highland-lowland interactions" context. Second, the synopsis of core problems of non-sustainable development mentioned in the different JACS workshops resulted in a modified list that reflects the diversity of issues raised by workshop participants. This was the result of adding new core problems, characterising others in terms of more specific aspects, and restating existing core problems. Third, the newly compiled list made it possible to compare the weightings assigned to problems in specific syndrome contexts. The most severe and least severe problems were identified, and combinations of problems described by several JACS workshops simultaneously were revealed and characterised as patterns. These patterns allow for hypotheses on syndromes of global change, as they appear to be based on typical clusters of problems that occur in several parts of the world in specific contexts. This leads to a description of potential syndromes in the "highland and mountain" context and the "urban and peri-urban" context, each being characterised by four patterns. Only two patterns were identified for a potential syndrome in the "highland-lowland interactions" context. The

weak basis for comparison of results did not make it possible to describe a potential syndrome in the "semi-arid" context. Fourth and finally, on average it appears that the syndromes in the "highland-lowland interactions" context are the most acute syndromes of global change, followed by the syndromes in the "urban and peri-urban" and "highland and mountain" contexts. Moreover, "governance failures and insufficient empowerment", "fragile economic systems" and "lack of adequate infrastructure" were determined to be among the most severe core problems. The present synthesis and the preliminary hypotheses on syndromes of global change offer the possibility of defining a set of common research questions in each syndrome context. It is therefore proposed to intensify context-oriented research in order to significantly advance the integration of research within the entire NCCR North-South.

13.1 Introduction

13.1.1 Overall goal and approach

The preceding chapters containing eight pre-synthesis reports for the NCCR North-South JACS regions are characterised by great diversity of content and methodology. Although this productive and critical diversity is a major asset of the NCCR approach, we might wonder if it is still possible to compare the outcomes of the workshops in terms of their integration within the overall framework of the NCCR programme. Thus we may ask:

– Are the syndrome contexts identified by the eight regional workshops still comparable to the original three syndrome contexts defined by the programme, and thus comparable to each other?

– Can we synthesise the numerous and diverse core problems of non-sustainable development identified by the different think tanks in each workshop in order to create a new overall list of core problems reflecting this diversity?

– With reference to the regional workshops where participants were asked to weight the core problems of non-sustainable development for each syndrome context according to their relevance at the global scale: what are the most serious core problems in each syndrome context, and do certain core problems receive similar weightings throughout the different JACS? In other words, can contexts be characterised by clusters of specific core problems of non-sustainable development, as hypothesised in Chapter 3?

– If certain relevant core problems appear simultaneously in one JACS, does the same combination of problems appear in other JACS? In other words, can patterns of specific combinations of core problems be observed in each context?

These questions reveal that synopsis and synthesis are of great interest and crucial importance to the entire programme, despite the uniqueness of each region. The overall goal of the present chapter is therefore to make a synoptic comparison of the results for the different syndrome contexts reported by the eight regional workshops. It must be recalled that no regional workshop and pre-synthesis report was foreseen for the JACS Alps, given its special subor-

dinate position in the programme. The report presented in Chapter 12 was thus not taken into account.

The synopsis and synthesis of the eight pre-synthesis reports implies a careful analysis of the workshop results based on a four-step approach:

(i) *Synopsis of syndrome contexts:*
The first step is an attempt to determine how the original syndrome contexts (i.e. "highland-lowland", "urban and peri-urban" and "semi-arid") were addressed in the regional workshops, whether they were maintained or further divided into sub-contexts, and whether contexts are still comparable.

(ii) *Synopsis and synthesis of core problems of non-sustainable development:*
The aim of the second step is to find out whether the core problems enumerated are comparable among different JACS. In other words, we will attempt to define congruencies without neglecting differentiations and innovative elements. The original list of core problems established during the conceptual workshop in Montézillon, Switzerland (see Chapter 3, Table 1, p. 51) will serve as a guideline.

(iii) *Weighting and combinations of core problems of non-sustainable development in different syndrome contexts:*
The third step is to link the syndrome contexts with the weightings assigned to core problems of non-sustainable development. We will thus look at specific syndrome contexts in different JACS to find out which core problems are considered severe. This step will provide two kinds of information: first, we will see the weighting assigned to each core problem by the different JACS, which will make it possible to compare different core problems in the syndrome contexts. Second, we may be able to determine whether a certain combination of relevant core problems in one JACS can also be observed in other JACS. This could eventually allow hypotheses about patterns formed by combinations of problems typical of specific syndrome contexts.

(iv) *Acuteness of syndromes and overall severity of core problems:*
Finally, a list of all aggregated syndrome contexts will give an overview of the overall relevance of core problems of non-sustainable development. It will further allow for a ranking of problems of global change in

the respective areas of examination. At the same time, it should reveal the differences between the JACS regions.

This four-step approach aims to provide answers to the questions posed above. It will hopefully contribute to fruitful discussions on syndromes and the syndrome approach, thereby strengthening integration within the NCCR North-South as a whole.

13.1.2 General methodological comments

As outlined in Chapter 3, the original methodology proposed for the eight regional workshops was modified considerably during application. Based on the major changes already stated in Chapter 3 and our own analysis of the results, the following methodological differences were encountered:

– Specific composition of the think tanks determining the selection and weighting of core problems;

– Addition of foci to the pre-synthesis approach, such as consideration of potentials and opportunities;

– Substantial modification of the originally proposed three syndrome contexts and proposal of new contexts;

– Different modes of weighting core problems (relevance at global scale, relevance for JACS region, relevance for IP topic, etc.) or elimination of this step;

– Differences between the list of core problems established for the syndrome contexts and the overall consolidated list of core problems for the JACS;

– Modification of the labels of the scientific realms in the original list, leading to elimination or addition of issues that had not been considered by other think tanks;

– Great variation in the number of core problems identified (from 17 to 52).

Although these modifications in methodology allowed for productive and critical diversity, they raise the methodological question of comparability. We dealt with this problem in the following ways: first, we often had to reduce our comparative analysis to the smallest common denominator, i.e. to a selection of JACS that could be compared. Second, interpreting complementary data in the texts sometimes enlarged this strict methodological restriction. Third, we believe that comparative analysis – even when all JACS are not included – still yields interesting data. It allows formulation of hypotheses that may be disproved at a later stage in the JACS regions. As the methodological constraints vary from step to step in our approach, we have inserted brief methodological comments where necessary in the following sections.

13.2 Synopsis of syndrome contexts

13.2.1 Overview of syndrome contexts

Based mainly on political considerations and the competence of involved partner institutions, the NCCR North-South selected three major contexts in which syndrome mitigation research would be concentrated: the "semi-arid", the "highland-lowland" and the "urban and peri-urban" contexts. These broad societal, economic, political and ecological contexts have not been defined as analytical categories. Rather, it is expected that one or several syndromes might be identified in each of these contexts. The first step in the regional workshops was therefore to describe specific contexts for each JACS region and determine whether sub-contexts had to be defined. This process should be the result of transdisciplinary negotiation on urgency and competence in addressing the respective contexts (see Chapter 3, section 4).

Table 1 gives an overview of all contexts and sub-contexts described by the think tanks in the different JACS workshops. The shaded areas represent the delimitations of the three original syndrome contexts. This shows the degree to which the newly defined contexts and sub-contexts coincide with the original contexts or, more problematically, cover more than one context at the same time. In addition, the white fields show areas where the corresponding contexts have not been considered, either because they were omitted or because they do not exist in the corresponding JACS.

Syndrome contexts	West Africa	East Africa	Horn of Africa	Central Asia	South Asia	South East Asia	Central America and the Caribbean	South America	Modified list of syndrome contexts
Urban and peri-urban	Urban and peri-urban	Urban and peri-urban areas (large and medium-sized cities)	Urbanisation	-	-	Urban and peri-urban	Urban and peri-urban	Urban and peri-urban	Urban and peri-urban
Highland-lowland	-	Mountains and highlands with a broad range of conflicting uses and stakeholders	Highlands: a) Drought-prone, low-potential b) Highly degraded, low-potential c) Highly degraded, high-potential d) Susceptible to degradation, high-potential	Intermediate (foothills and lowland zones and urbanised areas)	a) Marginality in mountain areas in relation to lowlands b) Indigenous people in mountain areas in relation to lowlands c) Fragility in mountain areas in relation to lowlands	Highland	Highland-lowland interactions: i.e. Highland (rural) – lowland (urban) interactions	Highland	Mountain and highland
		Areas of interaction between mainly productive highlands and semi-arid lowlands	Highland-lowland interactions	Mountains		Highland-lowland interactions		Highland-lowland interactions	Highland-lowland interactions
			Humid lowlands					Lowland	
Semi-arid	Semi-arid	Semi-arid: mixed use, irrigation and great economic and political disparities	Semi-humid and semi-arid lowlands in transition	Semi-arid (including highland-lowland interactions)	---	---	---	---	Semi-arid
		Encroaching agro-pastoral use by marginalised smallholders							
		Predominantly pastoral use in the economic and political periphery	Pastoralist lowlands						
		Including protected areas and their surroundings							

Table 1: Overview of contexts and sub-contexts defined during the eight regional JACS workshops (on the left: the original three NCCR North-South syndrome contexts).

13.2.2 The "urban and peri-urban" context

For the "urban and peri-urban" context there was great congruence throughout the different JACS. On the one hand there seems to be no need to define sub-contexts. On the other hand, there is a general consensus that this context must be addressed. However, the JACS Central Asia and JACS South Asia are important exceptions. Although they mentioned the urban context within their regional workshops, they did not address it explicitly but rather as one aspect of the "intermediate" context in Central Asia and as a "highland-lowland" syndrome context in South Asia. Unfortunately, this makes comparison with other JACS almost impossible.

13.2.3 The "highland-lowland" context

In the "highland-lowland" context there is a considerable need for further differentiation in all JACS except Central America and the Caribbean. Generally speaking, this differentiation is made in terms of two major sub-contexts: the "highland and mountain" and the "highland-lowland interactions" sub-contexts. In two JACS (Horn of Africa and South America) an additional distinction was made for "lowlands".

The aspect of interaction was at the centre of considerations in the "highland-lowland interactions" sub-context. Highland-lowland interactions were frequently overlaid by additional characteristics, such as rural-urban, productive-less productive, humid-arid or arid-humid, which should be taken into consideration when comparing interactions between highlands and lowlands in different JACS.

The remaining sub-contexts can be characterised as differentiations of "highland and mountain", with the exception of the JACS South Asia. Because in this JACS a choice was made for a strong thematic focus on marginality, indigenous people and fragility in relation to lowlands, direct comparison is difficult for both sub-contexts.

13.2.4 The "semi-arid" context

In the "semi-arid" context, further distinctions were made in East Africa and the Horn of Africa. In Central Asia, the aspect of interaction with highlands was underlined. The sub-contexts mentioned fit quite well with the overall syndrome context, and there appears to be no need for further differentia-

tion. Despite this great congruence, it seems noteworthy that only four out of eight JACS considered the "semi-arid" context, and that three of these are located in Africa. On other continents this context either does not occur or is not explicitly addressed (South Asia, Central America and the Caribbean, South America).

13.2.5 Conclusions on syndrome contexts

In conclusion, we can state that the "urban and peri-urban" and the "semi-arid" contexts show great congruence. Although urban and peri-urban areas occur in all JACS, only six JACS are comparable, as these contexts were not addressed in two cases. "Semi-arid" contexts were only addressed in four JACS, of which three are located in Africa. With regard to the "highland-lowland" context, we suggest further division into a "highland and mountain" sub-context and a "highland-lowland interactions" sub-context, as these two contexts are clearly distinct in terms of societal, economic, political and ecological aspects. Comparability for the "highland and mountain" context is possible in six of the eight JACS, although certain limitations may be encountered for South Asia, while five of the eight JACS addressed "highland-lowland interactions". For the latter, comparison should be made with caution, as the think tanks often highlighted specific characteristics of highland-lowland interactions such as rural-urban, humid-arid, etc.

13.3 Synopsis and synthesis of core problems of non-sustainable development

13.3.1 Procedure and methodology

During each JACS workshop, two lists of core problems were established. One is a list of the problems that occur in specific contexts or sub-contexts, the other a consolidated list of core problems relevant to the entire JACS. To obtain a synopsis of the consolidated lists, we initially classified all core problems according to the scientific realm they address and the JACS where they were identified. This classification was then further refined by trying to identify similar core problems in all the JACS, as well as problems that can be considered specific aspects of a more general problem. For this task, guidance was provided by the original list of core problems established during the Montézillon workshop (see Chapter 3, Table 1, p. 51). In other words, we linked each core problem mentioned in a JACS workshop to a core prob-

lem from the Montézillon list. This implies that certain core problems were shifted to another scientific realm. Three phenomena were observed in this process: 1) convergence, where problems generally match well, although certain specific aspects should not be forgotten; 2) divergence, where new aspects of core problems appear, thus calling for further differentiation among core problems; and 3) innovations, comprising aspects not previously considered and which cannot be subsumed in other core problems. We were then able to reformulate the overall list of core problems from Montézillon as a new, synthesised list of core problems (see Table 2, p. 397). This list reflects the diversity of core problems identified during the eight regional workshops.

Methodologically, the following challenges constrained the procedure described above:

– Great variation in the number of core problems selected for each JACS, i.e. the different degree of aggregation or differentiation. A selection of the most important problems had to be made for JACS with a very high number of core problems (based on the weighting established during the workshops). For JACS with only a few core problems that had several aspects, distinctions were sometimes made.

– Selection of core problems with respect to the main IP research themes: In some JACS it was obvious that the selection of core problems was not made with reference to sustainable development in general but with regard to the main research focus of the IP involved. Whenever possible, we tried to include such problems as specific aspects of more general core problems. However, problems that were too specific and thus incompatible with the list had to be excluded.

13.3.2 Synopsis of core problems in the political and institutional realm

Generally speaking, the eight regional workshops identified many severe core problems within the political and institutional realm. This led to a relatively high degree of differentiation by comparison with the initial list formulated in Montézillon.

With regard to the core problem of “inadequate institutions”, the regional think tanks first distinguished formal institutions from traditional and

indigenous institutions, whose continuous erosion was considered to be a severe problem. Furthermore, inadequate legal frameworks and regulations, lack of their enforcement and lack of corresponding means were mentioned as other important aspects of "inadequate institutions". With regard to weak formal institutions, it is important to note that they must be considered at different levels, from local communities to national and even international scales. There is also a serious problem of coordination among them. The difficulties of coordination between different levels and among various sectors are also important in relation to "contradictory and inadequate policies". Not only does lack of coordination lead to contradiction and conflicts, but the policies also fail to respond to social demands. These inadequacies were strongly underlined during determination of the different aspects of "governance failures and insufficient empowerment of actors". Apparently, the different regional think tanks seem to agree that one important aspect of governance failure is denial of self-determination – exclusion from political participation and decision-making – leading, among other things, to inactive citizenship. The dilemma between centralisation and decentralisation is closely related to this problem.

Other core problems in this scientific realm, such as "unequal distribution of power and resources", where the only addition was corruption, and "dominating and conflicting world views and ethical values", are characterised by great congruence throughout the JACS. One important innovation can be reported with regard to the Montézillon core problem lists: the weak international geopolitical position and negotiating power of regions and countries was mentioned by at least four JACS. This problem was characterised by a lack of inter-state mechanisms to deal with cross-border issues, regional geopolitical instability, and political and/or economic dependence on superpowers such as the USA.

13.3.3 Synopsis of core problems in the socio-cultural and economic realm

In the socio-cultural and economic realm, two core problems, "social and ethnic tensions" and "violent conflicts", were largely confirmed by the regional workshops. This is particularly true for differentiation between situations of tension and insecurity and outbreaks of violence. It is important to note that the core problem of "violent conflicts" includes outbreaks at different levels, from the individual (violence) to groups (crime), leading up to violent conflicts, possibly at the national or even international levels.

Regarding the core problem of "unused potentials for innovative capacities", an interesting dichotomy can be identified between constraints which may result from cultural norms and practices on the one hand, and the loss of indigenous knowledge on the other hand. Furthermore, the important issue of the flight of human capital – also known as "brain drain" – was brought up. Economic problems can also hinder education and training efforts when young people are forced to interrupt their education to find a job.

The core problem of "great social and economic disparities" was largely confirmed by the regional workshops. Gender disparities and inequality are a major aspect of this problem and were mentioned in almost all JACS.

Next, the entire domain of economic problems was analysed and compared. Starting with the general problem statement of "incompatible and fragile economic systems", a great variety of sub-problems were mentioned and repeatedly confirmed. An initial important differentiation was made between the formal and informal sectors of the local economies, and resulting conflicts and incompatibilities were underlined. These problems are further associated with issues such as limited market and employment opportunities, problems of privatisation, and unappealing settings for investment. A further important economic problem arises from the "dominance of the existing global economy", which hinders the development of national economies, either because of global regulations or because national economies are not competitive in a global context.

13.3.4 Synopsis of core problems in the population and livelihood realm

Comparison of core problems between different JACS reveals good congruence for "constraints on human rights and individual development potential". Great congruence can also be observed for "health risks and vulnerability to ill health" – a core problem mentioned by all eight JACS.

The core problem of "poverty and insecurity of livelihood" was further refined in urban contexts to encompass exclusion and social fragmentation associated with problems of unemployment, drug addiction, prostitution, etc. The key term "social depression" was also raised. In rural settings, the dominance of subsistence production and limited alternative livelihood systems were highlighted; these problems lead to high socio-economic vulnerability.

With regard to "population pressure and migration", the need for differentiation into the sub-categories of "population pressure and multi-dimensional migration" and "unfavourable dynamics and imbalances in socio-demographic structures" has already been noted above.

13.3.5 Synopsis of core problems in the infrastructure, services and land use realm

In the scientific realm of infrastructure, services and land use, some important specifications and innovations can be observed. The core problem of "lack of adequate infrastructure", including general aspects such as roads, supply of electric energy, etc., was further differentiated in terms of primarily urban aspects (housing, city infrastructure) and more rural aspects (transportation, irrigation). Several regional workshop think tanks also pointed out that management and maintenance of infrastructure is just as great a problem as installation of infrastructure.

With regard to the core problem of "access to land and natural resources", two important additions can be made: first, the problem of access is often a problem of ownership, i.e. inequitable land tenure systems, growing privatisation, etc. Second, land and natural resources should be complemented by common property resources, apparently a key issue in several JACS.

Besides these modifications of already existing core problems, three new topics were raised, which were later restated as new core problems. The first topic concerns land use. The regional workshops demonstrated that the problem must be explicitly addressed. This was not the case in the Montézillon list. Land use problems comprise many different aspects, ranging from non-optimal productivity levels and inappropriate technologies to conflicting interests and environmental externalities. The second topic concerns socio-economic services. An impressive array of severe problems were mentioned, consisting of more general aspects as well as specific needs, including the lack of very specific services such as education, extension services, health services, markets and credits, etc. A further issue raised by the think tanks in the regional workshops was access to information and communication flows. As six out of eight JACS explicitly complained in one form or another about discrimination related to information and communication flows, as well as access to technologies, we presume this should be addressed as a separate core problem.

13.3.6 Synopsis of core problems in the bio-physical and ecological realm

Generally speaking, the Montézillon list covered core problems in the bio-physical and ecological scientific realm quite well. Problems such as inadequate availability of freshwater or loss of biological diversity were largely confirmed. Nevertheless, the differentiations made by the think tanks in the eight workshops showed that the divisions did not really correspond to the needs of the JACS. First, land degradation was further refined into degradation of land, soil and vegetation cover; the problem of degradation of forests and other natural habitats was amended as a separate issue. Second, the proposed distinction between renewable and non-renewable resources faded in the JACS workshop lists, as these resources are equally threatened by pollution and overuse. Finally, the core problem of "risks of natural hazards and climate change" was complemented by "human-induced hazards".

13.3.7 Proposal of a modified list of core problems

As mentioned earlier in this chapter, observations and comparisons of the different lists produced some congruencies, some divergence and some interesting innovations. We therefore tried to modify the core problem list originally proposed in the Montézillon workshop by restating, differentiating, merging and adding core problems, thereby producing a new list of core problems (Table 2). This new list should more appropriately reflect the evaluations made in the eight regional workshops.

Table 2

Comparison of the list of potential core problems formulated in Montézillon and the list of core problems of non-sustainable development compiled by think tanks in eight regional JACS workshops.

Scientific realms	Core problems of non-sustainable development	
	List of potential core problems compiled in Montézillon	**List of core problems compiled by think tanks in eight regional JACS workshops**
Political & institutional		1 Weak international geopolitical position and negotiation power
	1 Dominating and conflicting world views and ethical values	2 Dominating and conflicting world views and ethical values
	2 Contradictory and inadequate policies	3 Contradictory policies and weak formal institutions at different levels
	3 Inadequate institutions	4 Inadequate legal framework and regulations, lack of enforcement and means
		5 Erosion of traditional and/or indigenous institutions
	4 Governance failures and insufficient empowerment of actors	6 Governance failures, insufficient empowerment and decentralisation
	5 Unequal distribution of power and resources	7 Unequal distribution of power and resources, corruption
Socio-cultural & economic	6 Social and ethnic tensions	8 Social, cultural and ethnic tensions and insecurity
	7 Violent conflicts	9 Prevalence of crime, violence and violent conflicts
	8 Unused potential of innovative capacities and existing knowledge	10 Unused or restricted innovative capacities and knowledge
	9 Great socio-economic disparities	11 Great socio-economic and gender disparities
	10 Incompatible and fragile economic systems	12 Incompatible and fragile economic systems with limited market and employment opportunities
	11 Dominance of the existing global economy	13 Dominance of the global economy over national development
Population & livelihood	12 Restrictions on human rights and individual development potential	14 Restrictions on human rights and individual development potential
	13 Poverty and livelihood insecurity	15 Poverty and livelihood insecurity
	14 Health risks and vulnerability to ill health	16 Health risks and vulnerability to ill health
	15 Population pressure and migration	17 Population pressure and multi-dimensional migration
		18 Unfavourable dynamics and imbalances in socio-demographic structures

(continued p. 398)

Table 2

(continued)

Scientific realms	Core problems of non-sustainable development	
	List of potential core problems compiled in Montézillon	**List of core problems compiled by think tanks in eight regional JACS workshops**
Infrastructure, services & land use	16 Poor water supply and environmental sanitation	19 Poor water supply and environmental sanitation
	17 Lack of adequate infrastructure (including energy supply)	20 Lack of adequate infrastructure and management such as transport, energy and irrigation
		21 Limited and inadequate socio-economic services such as education, health and markets
		22 Discrimination in information and communication flows and technologies
	18 Problems of access to land and natural resources	23 Inequality of ownership and access to land, natural and common property resources
		24 Inadequate and conflicting land use systems and technologies
Bio-physical & ecological	19 Inadequate availability of freshwater	25 Inadequate availability of freshwater
	20 Land degradation	26 Degradation of land, soil and vegetation cover
		27 Degradation of forests and other natural habitats
	21 Pollution and overuse of renewable natural resources	28 Pollution and overuse of renewable and non-renewable natural resources
	22 Loss of biological diversity	29 Loss of biological and agro-biological diversity
	23 Risks of natural hazards and climate change	30 Risks of natural and human-induced hazards and climate change
	24 Depletion of non-renewable natural resources	

13.4 Weighting of core problems in syndrome contexts and preliminary hypotheses on patterns

13.4.1 Procedure and methodological constraints

As argued earlier in this chapter, we propose to examine the new, synthesised list of core problems (Table 2) with reference to four rather than three syndrome contexts, since it is necessary to distinguish between the "highland and mountain" and the "highland-lowland interactions" contexts. The main point of looking at the syndrome contexts is to find out which core problems are considered the most acute in each context and whether "typical" combinations of core problems are found in each context. To this end we compared the different weightings of core problems occurring in the four syndrome contexts. In order to ensure a basis of comparison we proceeded as follows:

– Assigning of weightings to core problems: if a core problem listed by the JACS workshop was the same as one in the compiled list, the weighting was transferred as is. If two or more problems in the JACS list were aspects of only one core problem in the compiled list, the mean weighting of the two or more aspects was calculated and transferred.

– Standardisation of weightings by assigning a value from 0 to 3, with 0 = core problem not considered; 0.1 – 1 = not very acute core problem; 1.1 – 2 = acute core problem; 2.1 – 3 = very acute core problem. It may seem problematic to attribute the value 0 to a core problem that was not addressed, thus reducing the average score; still, if experts decide not to address a core problem, this seems to indicate that such a problem is not relevant within the region.

All weightings were then shown in a synoptic list, making it possible to calculate the mean acuteness of each problem by context. On the other hand, the overview of the different weightings revealed that certain combinations of core problems were repeated in other JACS. In other words, we tried to locate combinations of core problems that appeared not only in one JACS at a time but in the majority of JACS. These repeated combinations were then called "patterns".

Various problems arose as a result of variations in the methodologies applied in the eight regional JACS workshops, making the procedure a difficult one. These problems were:

– In certain JACS, weighting of core problems was not done for the entire JACS. The contexts described could not be used for comparison (Central America and the Caribbean, South Asia and partly South America).

– In other JACS, the list of core problems for the contexts was different from the overall list valid for all JACS. In this case, the weighting could not be considered (Central Asia).

These difficulties further reduced the number of comparable contexts. These were reduced in number as follows: for the "highland and mountain" context, six were reduced to four; in the "highland-lowland interactions" context only three of five contexts were comparable; in the "semi-arid" context, three of five remained; and in the "urban and peri-urban" context four of six remained.

13.4.2 The "highland-lowland interactions" sub-context

An overview of weightings assigned to different core problems in three JACS is presented in Table 3 (p. 402). Comparison of the weightings established by the regional think tanks in the JACS shows that the JACS East Africa generally chose higher values than the other JACS, i.e. it judged all problems to be generally more acute. It is not possible to determine at this stage whether a different set of criteria was applied or whether the problems are actually more acute. Further observations can also be made. Problems in the political and institutional realm generally received very high scores in the JACS Horn of Africa. Different problems were considered acute in the context of highland-lowland interactions: in the Horn of Africa these included "weak international geopolitical position and negotiation power", and in East Africa "prevalence of crime, violence and violent conflicts". It is also interesting to see that many problems in the bio-physical and ecological realm were considered less important in the highland-lowland interactions context in the Horn of Africa.

The average scores obtained by the specific core problems in the three different JACS show that political and institutional problems were regarded as

playing a predominant role in highland-lowland interactions (scores ≥ 2.0): "contradictory policies and weak formal institutions at different levels" as well as "governance failures and insufficient empowerment and decentralisation" are at the top of the list, followed by "erosion of traditional and/or indigenous institutions". Other major problems in this syndrome context are "social, cultural and ethnic tensions and insecurity" and "poverty and livelihood insecurity". Interestingly, "population pressure and migration" were considered less acute than "unfavourable dynamics and imbalances in socio-demographic structures", and "inadequate land use systems" less important than "inequality of ownership and access to land and resources".

The next step is to look at combinations of core problems appearing simultaneously. Of course, such combinations within one JACS are innumerable, but our perspective was different. We looked for combinations of important core problems that occur not only in one JACS but simultaneously in all three JACS. A combination of core problems that is the same in all three JACS constitutes a "pattern" of core problems. The final column in Table 3 indicates where such potential patterns exist: all core problems named in all three JACS considered acute (score ≥ 1.5) were marked with the letter [a]. This resulted in a combination of four core problems shown in the inner circle in Figure 1. If less acute core problems (score ≥ 1.0) are also taken into account, the combination of core problems is supplemented by five additional core problems marked with the letter [b] and shown in the outer circle in Figure 1.

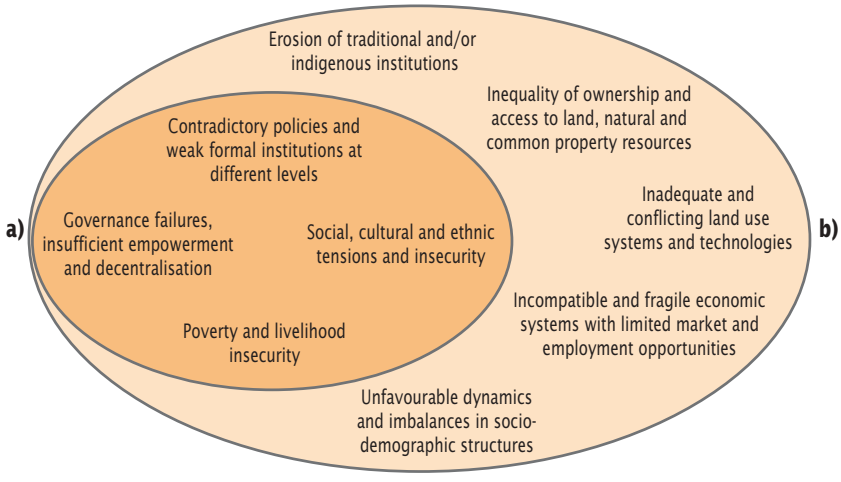

Fig. 1
Two sets of acute and less acute core problems occurring in all three JACS within the "highland-lowland interactions" subcontext, indicating a pattern and thus a potential syndrome in the "highland-lowland interactions" context.

Table 3

Weighted core problems of non-sustainable development for the "highland-lowland interactions" context. Average score per core problem and patterns of core problems:
a) repetition of combinations in all three JACS with weightings ≥ 1.5;
b) repetition of combinations in all three JACS with weightings ≥ 1.0.

Scientific realms	No.	Core problems: revised list	Horn of Africa	East Africa	South East Asia	Average score	Combinations that form patterns	
Political & institutional	1	Weak international geopolitical position and negotiation power	3	0	0	1		
	2	Dominating and conflicting world views and ethical values	3	1	0	1.3		
	3	Contradictory policies and weak formal institutions at different levels	3	2	3	2.7	a	
	4	Inadequate legal framework and regulations, lack of enforcement and means	0	0	2	0.7		
	5	Erosion of traditional and/or indigenous institutions	3	3	1	2.3		b
	6	Governance failures, insufficient empowerment and decentralisation	3	3	1.6	2.5	a	
	7	Unequal distribution of power and resources, corruption	2	2	0	1.3		
Socio-cultural & economic	8	Social, cultural and ethnic tensions and insecurity	3	2	2	2.3	a	
	9	Prevalence of crime, violence and violent conflicts	0	3	0.5	1.2		
	10	Unused or restricted innovative capacities and knowledge	0	2	0	0.7		
	11	Great socio-economic and gender disparities	3	2	0	1.7		
	12	Incompatible and fragile economic systems with limited market and employment opportunities	1	2	2	1.7		b
	13	Dominance of the global economy over national development	3	1	0	1.3		
Population & livelihood	14	Restrictions on human rights and individual development potential	0	2	0	0.7		
	15	Poverty and livelihood insecurity	2	2	3	2.3	a	
	16	Health risks and vulnerability to ill health	0	2	1	1		
	17	Population pressure and multi-dimensional migration	0	3	0.3	1.1		
	18	Unfavourable dynamics and imbalances in socio-demographic structures	3	3	1	2.3		b

Table 3
(continued)

Scientific realms	No.	Core problems: revised list	Horn of Africa	East Africa	South East Asia	Average score	Combinations that form patterns	
Infrastructure, services & land use	19	Poor water supply and environmental sanitation	0	2	0	0.7		
	20	Lack of adequate infrastructure and management such as transport, energy and irrigation	0	2	0.7	0.9		
	21	Limited and inadequate socio-economic services such as education, health, markets	2	2	0.7	1.6		
	22	Discrimination in information and communication flows and technologies	0	0	0	0		
	23	Inequality of ownership and access to land, natural and common property resources	3	2	1.3	2.1		b
	24	Inadequate and conflicting land use systems and technologies	1.7	2	1	1.6		b
Bio-physical & ecological	25	Inadequate availability of freshwater	0	3	2	1.7		
	26	Degradation of land, soil and vegetation cover	0	3	1.5	1.5		
	27	Degradation of forests and other natural habitats	0	3	1	1.3		
	28	Pollution and overuse of renewable and non-renewable natural resources	0	2	0	0.7		
	29	Loss of biological and agro-biological diversity	0	3	2	1.7		
	30	Risks of natural and human-induced hazards and climate change	2	2	0	1.3		

Very acute: > 2
Acute: ≤ 2 and > 1
Not very acute: ≤1 and > 0
Not acute: 0

Although the number of JACS serving as a basis for comparison is quite small and the methodological constraints are numerous, we can now hypothesise a syndrome in the "highland-lowland interactions" context consisting of a combination of five core problems, as shown in Figure 1. Moreover, if problems considered less acute in certain regions are also taken into account, an additional set of five core problems can be added. One could ask whether this is pure coincidence or whether it reflects a typical combination of core problems for the "highland-lowland interactions" context. It is too soon to answer this question. As mentioned above, such indications are hypotheses that need to be tested by studying problems and understanding underlying processes as well as possible interrelations. A syndrome in the "highland-lowland interactions" context can be said to exist only if the hypothesis is not falsified.

13.4.3 The "highland and mountain" sub-context

The overview of the weighted core problems in the "highland and mountain" context is given in Table 4 (p. 406). At first glance, no significant differences can be observed between the weightings established in the four JACS. In other words, we have neither an explicit reason to believe that the highlands and mountains in a certain JACS are completely different from region to region, nor that the methodology applied has a completely different logic. One can merely notice that within the JACS East Africa, the values assigned are again generally higher, and more weighting is given to the bio-physical and ecological realm, whereas the other JACS assigned greater importance to the political and institutional realm.

Focusing on the average scores, we can quickly see which problems are considered most acute in highlands and mountains in all four JACS (average weighting ≥ 2.0). "Poverty and livelihood insecurity" was weighted the most dominant core problem. It was followed by problems in other scientific realms: "governance failures, insufficient empowerment and decentralisation" and "unequal distribution of power and resources, corruption" in the political and institutional realm; "inequality of ownership and access to land" and "lack of adequate infrastructure" in the scientific realm of infrastructure, services and land use; and finally "degradation of land" and "degradation of forests and other natural habitats" in the bio-physical and ecological realm. Among the problems considered least acute in the "highland and mountain" context were: "dominance of the global economy over

national development", "constraints on human rights and individual development potential", "poor water supply and environmental sanitation", "discrimination in information and communication" and "pollution and overuse of natural resources".

In interpreting this general picture, we see that the prevalence of poverty and livelihood insecurity correlates with the degradation of land and forests. Interestingly, the next most important problems are not linked to "land use systems and technologies" but to questions of "ownership and access to land and resources", questions of "governance and decentralisation" and "distribution of power". Furthermore, the problem of infrastructure such as transport, roads, markets, etc. also appears to be very important. Among the least acute problems, some appear to be of little relevance, such as pollution of resources or water supply. On the other hand, there are also problems such as marginalisation in relation to the global economy, or discrimination with regard to information and communication flows, for which the weighting depends to a great extent on the perspective and evaluation criteria applied. These problems may not be perceived as being of overwhelming importance within the context itself or by the society concerned. Nevertheless, they must be considered as important root causes of other problems occurring within highlands and mountains.

Having gained an overview of problems in the "highland and mountain" syndrome context, we can turn our attention again to combinations of core problems that occur simultaneously in all JACS. As we can see in the final column of Table 4, the number of these combinations has increased from two to four ([a] – [d]) when compared to the "highland-lowland interactions" context. The reasons for this increase are that we have four rather than three JACS as a basis of comparison, and secondly, that we also accept a repetition of combinations in three of four JACS as a pattern. Correspondingly, only combination [a] is repeated in all four JACS, whereas combinations [b], [c] and [d] occur in three out of four JACS. Graphic depiction of these different combinations becomes more difficult, as many core problems are part of different combinations. Nevertheless, Figure 2 (p. 409) attempts to give a synopsis of the different combinations characterising the "highland and mountain" syndrome context.

Table 4

Weighted core problems of non-sustainable development for the "highland and mountain" sub-context. Average score per core problem and patterns of core problems:
a) repetition of combinations in all four JACS (weighting always > 0);
b) – d) repetition of combinations in three of four JACS (weighting always ≥ 1.5).

Scientific realms	No.	Core problems: revised list	South America	Horn of Africa	East Africa	South East Asia	Average score	Combinations that form patterns			
Political & institutional	1	Weak international geopolitical position and negotiation power	0	3	0	0	0.75				
	2	Dominating and conflicting world views and ethical values	0	0	2	0	0.5				
	3	Contradictory policies and weak formal institutions at different levels	0	2	2	1	1.3				
	4	Inadequate legal framework and regulations, lack of enforcement and means	2	0	0	1.5	0.9				
	5	Erosion of traditional and/or indigenous institutions	0	0	2	3	1.3				
	6	Governance failures, insufficient empowerment and decentralisation	2.5	0	3	2.7	2.1			c	
	7	Unequal distribution of power and resources, corruption	3	3	2	0	2				d
Socio-cultural & economic	8	Social, cultural and ethnic tensions and insecurity	3	0	1.5	3	1.9			c	
	9	Prevalence of crime, violence and violent conflicts	2	0	1.5	0.5	1				
	10	Unused or restricted innovative capacities and knowledge	1	2	1	0	1				
	11	Great socio-economic and gender disparities	0	0	2	2	1				
	12	Incompatible and fragile economic systems with limited market and employment opportunities	2	1	2	1	1.5	a			
	13	Dominance of the global economy over national development	0	1	1	0	0.5				
Population & livelihood	14	Restrictions on human rights and individual development potential	0	0	2	0	0.5				
	15	Poverty and livelihood insecurity	3	2	2	2	2.3	a	b	c	d
	16	Health risks and vulnerability to ill health	0	0	2	2	1				
	17	Population pressure and multi-dimensional migration	0	0	3	1	1				
	18	Unfavourable dynamics and imbalances in socio-demographic structures	0	0	3	0	0.8				

Table 4
(continued)

Scientific realms	No.	Core problems: revised list	South America	Horn of Africa	East Africa	South East Asia	Average score	Combinations that form patterns			
Infrastructure, services & and land use	19	Poor water supply and environmental sanitation	0	0	2	0	0.5				
	20	Lack of adequate infrastructure and management such as transport, energy and irrigation	2	2	2	2	2	a	b	c	d
	21	Limited and inadequate socio-economic services such as education, health, markets	0	0	2	1.7	0.9				
	22	Discrimination in information and communication flows and technologies	0	2	0	0	0.5				
	23	Inequality of ownership and access to land, natural and common property resources	1	2.5	3	1.7	2.1	a	b		
	24	Inadequate and conflicting land use systems and technologies	1	0.7	2	1	1.2	a			
Bio-physical & ecological	25	Inadequate availability of freshwater	0	1	1	1	0.8				
	26	Degradation of land, soil and vegetation cover	0.6	3	3	1.5	2	a	b		
	27	Degradation of forests and other natural habitats	2	1	3	2	2	a		c	d
	28	Pollution and overuse of renewable and non-renewable natural resources	0	0	2.5	0	0.6				
	29	Loss of biological and agro-biological diversity	0	2	3	2	1.8		b		
	30	Risks of natural and human-induced hazards and climate change	0	2	2	0	1				

Very acute: > 2
Acute: ≤ 2 and > 1
Not very acute: ≤1 and > 0
Not acute: 0

At the core of this problem cluster we find the problems of "poverty and livelihood insecurity" and "lack of adequate infrastructure and management". These problems are involved in all four combinations. Together with three other problems involved in more than one combination ("degradation of forests and other natural habitats", "degradation of land, soil and vegetation cover" and "inequality of ownership and access to land and resources"), they form the nucleus of the problems in the "highland and mountain" context. This basic consideration facilitates understanding of specific combinations, and we can now concentrate on the additional elements.

The above-mentioned cluster of core problems has specific characteristics if we look at combination [a], which has the two additional elements of "inadequate and conflicting land use systems" and "incompatible and fragile economic systems". We should note that these two problems appear simultaneously, suggesting a potential correlation between them. The same correlation might be seen in combination [c] between "social, cultural and ethnic tensions" and "governance failures, insufficient empowerment and decentralisation". Concerning combination [b], it is striking that there seems to be a closer relation between "loss of biological diversity" and issues such as "degradation of land" or "inequality of ownership and access to resources" than to "degradation of forests and other natural habitats".

Of course, the above observations can still be expanded and require further discussion. Hypotheses as such should then guide further research in the "highland and mountain" syndrome context. As mentioned earlier, the hypotheses must be challenged by studying and understanding the underlying processes. Once these questions are verified, we will be able to describe a syndrome in the "highland and mountain" context, as suggested by Figure 2.

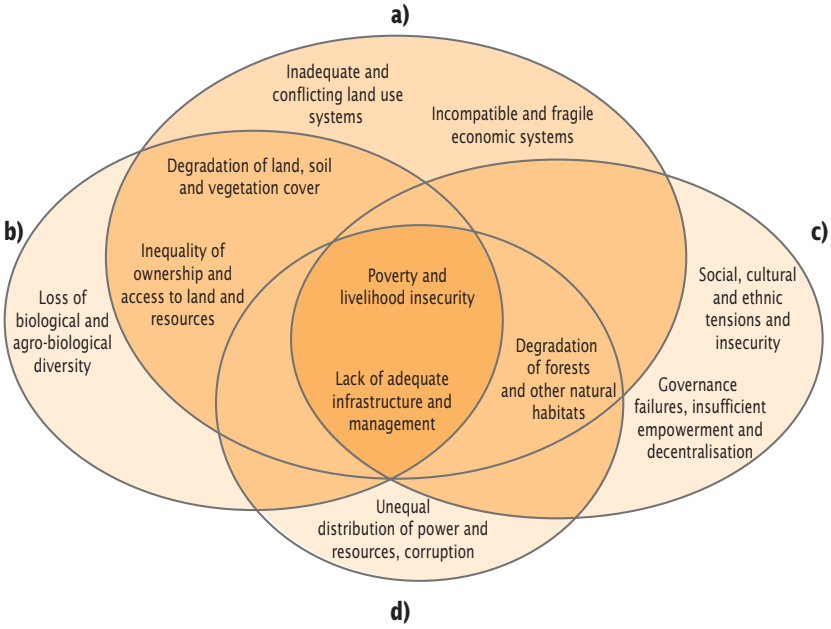

Fig. 2
Four combinations of core problems within the "highland and mountain" syndrome context. As combination [a] occurs in all four JACS and combinations [b], [c] and [d] occur in three out of four JACS, they indicate possible patterns and thus a potential syndrome in the "highland and mountain" context.

13.4.4 The "semi-arid" context

Examining the overview of weighted core problems in the "semi-arid" context (see Table 5, p. 410), we see that the highest scores were given to problems in the realm of infrastructure, namely "limited and inadequate socio-economic services" and "lack of adequate infrastructure and its management". These are followed by two problems in the socio-cultural realm, "great socio-economic and gender disparities" and "incompatible and fragile economic systems", where especially the conflicts between the traditional and modern economies were mentioned.

Yet if we observe the weightings assigned by the different regional workshops, we perceive major differences between the JACS West Africa and the two other JACS in East Africa and the Horn of Africa. Whereas the think tanks in the JACS East Africa and Horn of Africa generally rated the problems as being quite acute, giving a certain emphasis to the bio-physical and ecological realm, participants in the JACS West Africa workshop generally rated fewer core problems as being relevant. They identified no major problems in

Table 5

Weighted core problems of non-sustainable development for the "semi-arid" syndrome context, and average score per core problem.

Scientific realms	No.	Core problems: revised list	West Africa	Horn of Africa	East Africa	Average score
Political & institutional	1	Weak international geopolitical position and negotiation power	0	2	0	0.7
	2	Dominating and conflicting world views and ethical values	0	0	1	0.3
	3	Contradictory policies and weak formal institutions at different levels	0	2.5	2	1.5
	4	Inadequate legal framework and regulations, lack of enforcement and means	0	0	0	0
	5	Erosion of traditional and/or indigenous institutions	0	2	3	1.7
	6	Governance failures, insufficient empowerment and decentralisation	1	2	2	1.7
	7	Unequal distribution of power and resources, corruption	0	2	1.5	1.2
Socio-cultural & economic	8	Social, cultural and ethnic tensions and insecurity	0	2	2.5	1.5
	9	Prevalence of crime, violence and violent conflicts	0	2	2.5	1.5
	10	Unused or restricted innovative capacities and knowledge	0	0	1.5	0.5
	11	Great socio-economic and gender disparities	3	2	2	2.3
	12	Incompatible and fragile economic systems with limited market and employment opportunities	1.5	2	3	2.2
	13	Dominance of the global economy over national development	0	0	2	0.7
Population & livelihood	14	Restrictions on human rights and individual development potential	0	0	2	0.7
	15	Poverty and livelihood insecurity	0	2	2	1.3
	16	Health risks and vulnerability to ill health	2	2	3	2.3
	17	Population pressure and multi-dimensional migration	0	0	2	0.7
	18	Unfavourable dynamics and imbalances in socio-demographic structures	0	3	2	1.7

Table 5

(continued)

Scientific realms	No.	Core problems: revised list	West Africa	Horn of Africa	East Africa	Average score
Infrastructure, services & land use	19	Poor water supply and environmental sanitation	1.5	0	3	1.5
	20	Lack of adequate infrastructure and management such as transport, energy and irrigation	2	3	2.5	2.5
	21	Limited and inadequate socio-economic services such as education, health, markets	2.7	2	3	2.6
	22	Discrimination in information and communication flows and technologies	2	0	0	0.7
	23	Inequality of ownership and access to land, natural and common property resources	0	2	3	1.7
	24	Inadequate and conflicting land use systems and technologies	0	1.4	2.5	1.3
Bio-physical & ecological	25	Inadequate availability of freshwater	0	2	3	1.7
	26	Degradation of land, soil and vegetation cover	0	2	3	1.7
	27	Degradation of forests and other natural habitats	0	2	3	1.7
	28	Pollution and overuse of renewable and non-renewable natural resources	1	0	2	1
	29	Loss of biological and agro-biological diversity	0	2	3	1.7
	30	Risks of natural and human-induced hazards and climate change	0	1	2	1

Very acute: > 2

Acute: ≤ 2 and > 1

Not very acute: ≤1 and > 0

Not acute: 0

the bio-physical and ecological realm (e.g. "inadequate availability of freshwater", "degradation of land") or in the political and institutional realm. This great heterogeneity among the JACS gives rise to serious questions about the comparability of the JACS West Africa workshop results, based on methodological considerations. Undoubtedly, the explicit focus on health contributed to this heterogeneity.

For these reasons we will refrain from identifying patterns of a potential syndrome in the "semi-arid" context. Nevertheless, Table 5 shows quite interesting congruencies between the JACS Horn of Africa and the JACS East Africa, which may allow for further inquiry and formulation of hypotheses in future.

13.4.5 The "urban and peri-urban" context

According to the overview given in Table 6 (p. 414), the weightings assigned to urban problems in different JACS give only limited reason to suspect major topical or methodological differences. We can observe a high general scoring by the JACS East Africa, whereas scores in West Africa are generally low. Furthermore, bio-physical and ecological problems do not seem to be an issue in urban contexts in the Horn of Africa, whereas they are given high priority in South East Asia. This difference could be ascribed to the selection of participants in the respective think tanks. The same observation might be true for the few political and institutional problems and the non-relevance of poverty and insecure livelihoods in cities of West Africa. And it may also apply to the assessment that tensions, insecurity, crime and violence in urban contexts in the Horn of Africa or West Africa are not as acute as in other JACS.

Considering the average scores in the four JACS, only three core problems received a weighting indicating high importance: "lack of infrastructure and management", "health risks and vulnerability to ill health" and "incompatible and fragile economic systems with limited market and employment opportunities". We may recall that the latter problem was classified above as essentially a conflict between the formal and informal sectors. This incompatibility was further associated with specific problems such as limited market and employment opportunities, problems of privatisation and settings unattractive for investment. When light is shed on the least acute problems, problems that are not really relevant to urban settings become obvious. Yet it is interesting to see that in urban contexts certain other problems receive a very low score: neither "social, cultural and ethnic tensions" nor "inade-

quate legal framework and regulations" seem to be very important, nor do constraints on human rights or imbalanced socio-demographic structures. Although certain points would probably require additional verification to exclude methodological problems, further investigation of core problems not considered acute would certainly be of interest, in view of potentials and opportunities for sustainable development in urban contexts.

As was the case for the "highland and mountain" context, here, too, four JACS are the basis of comparison to examine combinations of core problems, leading to a greater number of combinations (see last column of Table 6). Setting aside repetition in all four JACS (as is the case for combination [a]), the three other combinations ([b], [c] and [d]) each occur in three out of four JACS. Allowance is again made for overlapping areas (Figure 3) since certain core problems are an element of several combinations at the same time.

The two core problems mentioned above – which were assigned the highest overall score – are also at the centre of this problem cluster in urban contexts. Combination [a], containing "incompatible and fragile economic systems" and "lack of infrastructure", is not only an integral part of all other combina-

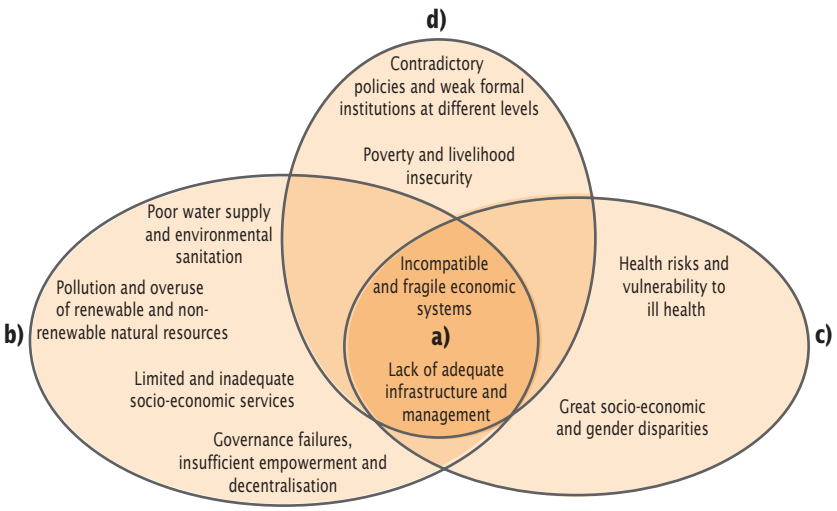

Fig. 3
Four combinations of core problems in the "urban and peri-urban" syndrome context. As combination [a] occurs in all four JACS and combinations [b], [c] and [d] occur in three out of four JACS, they indicate possible patterns and thus a potential syndrome in the "urban and peri-urban" context.

Table 6

Weighted core problems of non-sustainable development for the "urban and peri-urban" syndrome context. Average score per core problem and patterns of core problems:
a) repetition of combinations in all four JACS (weighting always > 0);
b) – d) repetition of combinations in three out of four JACS (weighting always ≥ 1.5).

Scientific realms	No.	Core problems: revised list	West Africa	Horn of Africa	East Africa	South East Asia	Average score	Combinations that form patterns
Political & institutional	1	Weak international geopolitical position and negotiation power	0	0	0	3	0.8	
	2	Dominating and conflicting world views and ethical values	0	2	3	0	1.3	
	3	Contradictory policies and weak formal institutions at different levels	0	1.5	3	2.5	1.75	d
	4	Inadequate legal framework and regulations, lack of enforcement and means	0	0	0	2	0.5	
	5	Erosion of traditional and/or indigenous institutions	0	0	1	0	0.25	
	6	Governance failures, insufficient empowerment and decentralisation	3	0	2	1.7	1.7	b
	7	Unequal distribution of power and resources, corruption	0	2	2.5	0	1.1	
Socio-cultural & economic	8	Social, cultural and ethnic tensions and insecurity	0	0	2.5	0	0.6	
	9	Prevalence of crime, violence and violent conflicts	0	0	2.5	2	1.1	
	10	Unused or restricted innovative capacities and knowledge	0	0	1.5	2	0.9	
	11	Great socio-economic and gender disparities	3	2	2	0	1.8	c
	12	Incompatible and fragile economic systems with limited market and employment opportunities	3	2	3	1.7	2.4	a b c d
	13	Dominance of the global economy over national development	0	2	3	0	1.3	
Population & livelihood	14	Restrictions on human rights and individual development potential	0	0	2	0	0.5	
	15	Poverty and livelihood insecurity	0	2.5	2.5	2	1.6	d
	16	Health risks and vulnerability to ill health	3	2	3	0	2	c
	17	Population pressure and multi-dimensional migration	0	0	3	2	1.3	
	18	Unfavourable dynamics and imbalances in socio-demographic structures	0	2	0	0	0.5	

Table 6

(continued)

Scientific realms	No.	Core problems: revised list	West Africa	Horn of Africa	East Africa	South East Asia	Average score	Combinations that form patterns			
Infrastructure, services & land use	19	Poor water supply and environmental sanitation	1.5	0	3	2.6	1.8		b		
	20	Lack of adequate infrastructure and management such as transport, energy and irrigation	3	2	2.5	2.3	2.5	a	b	c	d
	21	Limited and inadequate socio-economic services such as education, health, markets	3	0	3	1.3	1.8		b		
	22	Discrimination in information and communication flows and technologies	3	0	0	3	1.5				
	23	Inequality of ownership and access to land, natural and common property resources	0	1.5	2	0	0.9				
	24	Inadequate and conflicting land use systems and technologies	0	0	2	2	1				
Bio-physical & ecological	25	Inadequate availability of freshwater	0	0	1	3	1				
	26	Degradation of land, soil and vegetation cover	0	0	1	0	0.3				
	27	Degradation of forests and other natural habitats	0	0	1	2	0.8				
	28	Pollution and overuse of renewable and non-renewable natural resources	3	0	2	2.5	1.9				
	29	Loss of biological and agro-biological diversity	0	0	2	0	0.5		b		
	30	Risks of natural and human-induced hazards and climate change	0	0	2	3	1.3				

Very acute: > 2

Acute: ≤ 2 and > 1

Not very acute: ≤1 and > 0

Not acute: 0

tions of core problems, but also occurs in all four JACS. The fact that infrastructure is such an important issue might seem somewhat surprising. Nevertheless, if we recall that this aspect comprises housing, city services, transportation, energy supply, etc., it becomes clear that it is a very important condition of development.

Having made this observation about these two central problems, we can now search for additional characteristics of the urban problem cluster by observing the other combinations. For example, interpretation of combination [b] might lead to the assumption that the problem of fragile economic systems could be associated with the problem of lacking socio-economic services on the one hand and governance failures on the other hand. Simultaneously, we could suggest a relationship between the lack of infrastructure and the problems of water supply, environmental sanitation and the pollution and overuse of resources. Combination [d] underlines the central aspect of economic problems by associating it with "poverty and livelihood insecurity" and the issue of "contradictory policies and weak institutions". Finally, combination [c] links the central problems closely with socio-economic and gender disparities as well as health problems. It is not surprising that these problems are named simultaneously – nevertheless, the underlying processes need to be illuminated.

In conclusion, we need to recall that these combinations – which appear as patterns throughout the JACS – must be considered as hypotheses. They require further investigation for confirmation as a syndrome in the "urban and peri-urban" context, as suggested by Figure 3. The questions that guide research must tackle the underlying processes responsible for the occurrence of the above-mentioned problems.

Table 7

Context / JACS	Highland and mountain	Highland – lowland interactions	Semi-arid	Urban and peri-urban
West Africa			0.6	0.9
East Africa	1.8	2.1	2.2	2.1
Horn of Africa	1.0	1.3	1.5	0.7
South East Asia	1.1	1.0		1.4
South America	0.8			
Average	**1.2**	**1.5**	**1.4**	**1.3**

Very acute: > 2
Acute: ≤ 2 and > 1
Potentially acute: ≤1 and > 0
Not assessed / not relevant: 0

Comparison of total average weightings attributed to each syndrome context in a JACS, indicating the relative acuteness of syndromes in each JACS analysed.

13.5 Acuteness of syndromes and overall acuteness of core problems

13.5.1 Acuteness of syndromes according to JACS

Having presented all four syndrome contexts separately by looking at the weightings attributed to core problems and the resulting combinations and patterns, we need to broaden our focus again. First we would like to know in what region the assumed syndromes are particularly acute. In other words, we shall try to confirm or falsify the hypotheses formulated in Chapter 1.5 (p. 19), which were based on literature and expert knowledge. Table 7 shows the information available from the preceding analysis, corresponding to the average scores attributed to each context in each JACS. Yet from a methodological point of view, we must warn against rash interpretations of this table. As the criteria for assigning weightings were not exactly the same in each workshop, comparison of average scores for the JACS is not really valid. In other words, we should read along the horizontal lines instead of along the columns of Table 7, to get indications of the relative acuteness of syndromes in each JACS. Conversely, it would be wrong to claim that the syndrome in the "urban and peri-urban" context is most acute in East Africa.

Table 8

Average scores of weightings attributed to core problems of non-sustainable development in JACS and total (weighted) average scores for core problems.

Scientific realms	No.	Core problems: revised list	West Africa n=2	East Africa n=4	Horn of Africa n=4	South East Asia n=3	South America n=1	Average score (weighted by n)	Rank
Political & institutional	1	Weak international geopolitical position and negotiation power	0	0	2	1	0	0.8	13
	2	Dominating and conflicting world views and ethical values	0	1.8	1.3	0	0	0.9	12
	3	Contradictory policies and weak formal institutions at different levels	0	2.3	2.3	2.2	0	1.8	3
	4	Inadequate legal framework and regulations, lack of enforcement and means	0	0	0	1.8	2	0.5	16
	5	Erosion of traditional and/or indigenous institutions	0	2.3	1.3	1.3	0	1.3	8
	6	Governance failures, insufficient empowerment and decentralisation	2	2.5	1.3	2	2.5	2	1
	7	Unequal distribution of power and resources, corruption	0	2	2.3	0	3	1.4	7
Socio-cultural & economic	8	Social, cultural and ethnic tensions and insecurity	0	2.1	1.3	1.7	3	1.6	5
	9	Prevalence of crime, violence and violent conflicts	0	2.4	0.5	1	2	1.2	9
	10	Unused or restricted innovative capacities and knowledge	0	1.5	0.5	0.7	1	0.8	13
	11	Great socio-economic and gender disparities	3	2	1.8	0.7	0	1.7	4
	12	Incompatible and fragile economic systems with limited market and employment opportunities	2.3	2.5	1.5	1.6	2	2	1
	13	Dominance of the global economy over national development	0	1.8	1.5	0	0	0.9	12
Population & livelihood	14	Restrictions on human rights and individual development potential	0	2	0	0	0	0.6	15
	15	Poverty and livelihood insecurity	0	2.1	2.1	2.3	3	1.9	2
	16	Health risks and vulnerability to ill health	2.5	2.5	1	1	0	1.6	5
	17	Population pressure and multi-dimensional migration	0	2.8	0	1.1	0	1	11
	18	Unfavourable dynamics and imbalances in socio-demographic structures	0	2	2	0.3	0	1.2	9

Table 8
(continued)

Scientific realms	No.	Core problems: revised list	West Africa n=2	East Africa n=4	Horn of Africa n=4	South East Asia n=3	South America n=1	Average score (weighted by n)	Rank
Infrastructure, services & land use	19	Poor water supply and environmental sanitation	1.5	2.5	0	0.9	0	1.1	10
	20	Lack of adequate infrastructure and management such as transport, energy and irrigation	2.5	2.3	1.8	1.7	2	2	1
	21	Limited and inadequate socio-economic services such as education, health, markets	2.9	2.5	1	1.2	0	1.7	4
	22	Discrimination in information and communication flows and technologies	2.5	0	0.5	1	0	0.7	14
	23	Inequality of ownership and access to land, natural and common property resources	0	2.5	2.3	1	1	1.7	4
	24	Inadequate and conflicting land use systems and technologies	0	2.1	1	1.7	1	1.3	8
Bio-physical & ecological	25	Inadequate availability of freshwater	0	2	0.8	2	0	1.2	9
	26	Degradation of land, soil and vegetation cover	0	2.5	1.3	1	0.6	1.3	8
	27	Degradation of forests and other natural habitats	0	2.5	0.8	1.7	2	1.5	6
	28	Pollution and overuse of renewable and non-renewable natural resources	2	2.1	0	0.8	0	1.1	10
	29	Loss of biological and agro-biological diversity	0	2.8	0.5	1.3	0	1.2	9
	30	Risks of natural and human-induced hazards and climate change	0	2	1.5	1	0	1.2	9

Very acute: > 2
Acute: ≤ 2 and > 1
Not very acute: ≤ 1 and > 0
Not acute: 0

13.5.2 Compiled list of weighted core problems

We are also interested to know which core problems linked to global change were considered the most acute in the different JACS, independent of specific syndrome contexts. Furthermore, we want to know what the most acute core problems are, independent of a specific syndrome context and a specific JACS. The results are presented in Table 8 (p. 418). This table not only gives an overview of weightings in each JACS, but also a weighted average for all JACS. This made it possible to establish a ranking according to the general acuteness of problems (last column).

If we look first at the JACS columns, we perceive clear differences between the different regions. As noted earlier, East Africa perceived the acuteness of core problems to be generally greater than other JACS did. In West Africa less weight was assigned to political and institutional problems and to biophysical and ecological issues. Finally, problems in South America seem to be concentrated in the political and institutional realm and the socio-cultural and economic realm. Of course, these observations might just underline the fact that each JACS is a distinct region and that, correspondingly, the acuteness of problems of global change varies. But as pointed out at the beginning of this chapter, we have reasons to assume that the main differences are of a methodological nature, e.g. the composition of think tanks and their thematic focus, the criteria established for weighting, etc. In this sense it is clear that we must be very careful when making direct comparisons between weightings assigned in the JACS.

Despite these reservations, the average ranking of core problems can easily be justified from a methodological point of view. Independent of syndrome contexts, the five core problems of global change considered most acute were:

– Governance failures, insufficient empowerment and decentralisation;
– Incompatible and fragile economic systems with limited market and employment opportunities;
– Lack of adequate infrastructure and management;
– Poverty and livelihood insecurity;
– Contradictory and inadequate policies.

Conversely, the three core problems of global change considered least acute were:

– Inadequate legal framework and regulations, lack of enforcement and corresponding means;
– Restrictions on human rights and individual development potential;
– Discrimination in information and communication flows and technologies.

13.6 Conclusions

The present chapter has attempted to synthesise the outcomes of eight JACS workshops described in the second part of this publication. As mentioned in Chapter 3 and confirmed in the preceding chapters, there was considerable diversity in terms of content as well as applied methodologies. Although this diversity was creative and highly productive, it restricted comparability and hence the possibilities of synthesis. Nevertheless, the efforts described in the present chapter produced a number of significant outcomes, of which the synopsis of syndrome contexts is a first important result. We have seen that discussing the meaning and understanding of the different syndrome contexts more clearly is a pre-condition for integration and synthesis within the NCCR North-South. We have also had to realise that certain syndrome contexts cannot be compared at this point, although they carry the same label. Furthermore, we have recognised that the "highland-lowland" syndrome context has to be split into two sub-contexts, for a clearer differentiation between highland and mountain areas and aspects of interaction, as these are too distinct. It is therefore probable that two syndromes will be defined within this context.

Once this basis for comparison was clarified, we were able to tackle the establishment of a consolidated list of core problems – a further pre-condition for comparing the weighting of problems between the JACS. This process proved to be a very fruitful exercise, since the diversity of workshops contributed to a very rich and differentiated image of relevant core problems of global change. Generally speaking, the list formulated in Montézillon was largely confirmed, and the problems anticipated by northern experts were remarkably complete. Nevertheless, some important additions and modifications had to be made. First, additional core problems were

identified and had to be added to the list (e.g. "weak geopolitical position and lack of negotiation power", "imbalances in socio-demographic structures", "limited and inadequate socio-economic services", "inadequate and conflicting land use systems", etc.). Second, certain existing core problems had to be amended by specific aspects that should be explicitly addressed (e.g. legal frameworks and their enforcement, erosion of indigenous institutions, gender disparities, entitlement to land and resources, etc.). Third, great differentiation among certain core problems called for a separation of too generally formulated problems into more precise sub-problems. All these modifications produced a new list of 30 core problems. This list needs to be further elaborated within the framework of the NCCR North-South for two reasons. First, a consensus must be reached on the different modifications and their compatibility with JACS situations. Second, the modified list might reveal certain new aspects to researchers already working on specific core problems, which they ought to take into consideration. Furthermore, IPs and JACS may have to reconsider allocation of resources and expertise in order to address identified core problems adequately.

When it came to comparing the weightings of core problems according to the different syndrome contexts, the basis for comparison was further restricted by methodological constraints: an average of three to four JACS remained per syndrome context. Nevertheless, we think that this small database made it possible to attempt a reasonable characterisation of syndrome contexts by describing the most important core problems and by identifying initial combinations of core problems – patterns that indicate potential syndromes of global change. For two syndrome contexts – "highland and mountain" and "urban and peri-urban" – a set of four patterns was determined, which allows for hypotheses on syndromes of global change. For the "highland-lowland interactions" context, only two patterns could be identified, which nonetheless give certain indications of a potential syndrome. However, we should recall that these interactions have different characteristics in different JACS, which must be taken carefully into account in future research. With regard to the "semi-arid" context, the available information had to be questioned for methodological reasons. As a consequence, it was not possible to establish a hypothesis relating to a syndrome in the "semi-arid" context.

These preliminary hypotheses on syndromes of global change give reason to believe that the three syndrome contexts can be clearly distinguished from each other, as the patterns identified are also different from one another. Conversely, each syndrome context is relatively homogeneous in rela-

tion to core problems of non-sustainable development in the different JACS – a basic hypothesis for the definition of syndrome contexts postulated in Chapter 3.

To conclude, we should briefly reflect on the relevance of the present synthesis for future research within the NCCR North-South. Although the basis for comparison was somewhat restricted due to methodological diversity, the synopsis of contexts and core problems yielded valuable results: the revised core problem list, and the hypotheses on four syndromes of global change to an even greater extent, constitute the basis for a potential set of common research questions. In other words, we see a considerable potential for intensifying research within the different syndrome contexts, with a view to further integration within the framework of the entire programme. This implies that context-oriented research should be strengthened, and that the partnership institutions in the JACS should ensure that all relevant contexts in their regions are adequately addressed. Concretely, the basis for the above comparison could be broadened if the methodological problems in Central Asia, Central America, South America and South Asia can still be overcome. This would make it possible not only to refine the postulated hypotheses, but also to involve the missing JACS in the further research process on syndrome contexts. At a later stage, when studying the underlying processes and verifying hypotheses, certain syndrome contexts not yet addressed can still be added for comparison, e.g. the urban contexts in Central and South Asia, the highland context in Central America, or the semi-arid context in South Asia. It will also be very interesting to extend this comparison to the JACS Alps, whenever feasible. Finally, the potentials and opportunities for sustainable development must also be integrated into the future research process, as has already been done in the South Asia workshop. Analysis of the core problems judged to be the least acute in the different syndrome context might be an entry point for this purpose. Finally, it is probable that some of these suggested research efforts are not yet part of the IP research agendas. Hence it is urgent to allocate the necessary resources and expertise to pursue these studies.