Integration of reflective socio-anthropological knowledge into an interdisciplinary project as a key to an understanding approach to the global climate change research

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Abstract. This article shows the way that has been passed from the problem statement in the organization of interdisciplinary research and the search for a key research question to designing a unique interdisciplinary research program, thanks to scientific diplomacy and intellectual and data resources of academic networks such as SecNet and INTERACT. We will focus on nine steps of soft intervention in an explored field and present the first results of a pilot empirical research, organized with a combination of methods of changing landscapes and soils in Western Siberia analysis, interpretation of archival data and satellite images showing the dynamics of terrestrial ecosystems and climate in the West Siberian Arctic, and the method of interviewing and questioning of local residents of the studied microregions regarding their perception of climate change.

1. Challenges and risks of interdisciplinary research

Formation of a balanced interdisciplinary project based on conceptual rather than mechanical assembly requires a special facilitator position. The question is whether social anthropologist can execute such function in a scientific team. In this article I’ll try to outline how and in what cases socio-anthropological knowledge can helpful for maintaining, support and making design of a complex project.

If we are talking about an interdisciplinary project, the first function of the social anthropologist in the team is to assess the impact on the “clean”, untouched environment, that is in the focus of the research for the members of the team, that are producing measurements, experiments and simply – moving in space. Assessment of the impact of scientists and the social environment opens the possibility to make adjustments in the interpretation of the data.

In addition, our task is to minimize such influence in the future, and prepare members of the interdisciplinary team to “dive” into the field in such a way that in the future this field and this environment will allow scientists to return and continue research in the long term. This becomes particularly relevant when expeditions are planning to work across the territories inhabited by indigenous peoples of the North, near the nomad camps. In such cases the success of cooperation and mutual understanding is determined, on the one hand, by the compliance with the rules of the game, and, on the other hand, mutual respect, openness and respect to unspoken ethical principles.
2. Nine steps of the “soft intervention” in field

Elaboration of the special ethical guidelines adapted to the Russian specific of socio-economic system, lifestyles and landscape is closely connected with the «field soft intervention» approach in the context of interdisciplinary research, that aims at saving fragile components of an explored socio-cultural environment.

Here I want to outline 9 steps that one project should pass in order to consider all the peculiarities of natural sciences and humanities and make a well-balanced research assembly.

2.1. Key questions
The first step intends to state key research questions, that are relevant both for fundamental comparative research in natural sciences and humanities, and have practical value to adjust the programs of local and regional development and involvement of local communities. The process of stating key questions may also include pilot research in local communities, living, migrating and working in the area, that is potentially going to be researched. Included observation and interviewing of the locals may help to highlight the most crucial questions and problems, connected with the ecology, natural management, subsistency, infrastructure, health, education, etc.

2.2. Sites and routes
The second step is focused on the process of revelation and specification of the most suitable field-sites or research routes where both natural (physical, biological, etc.) and anthropogenic (human, social) phenomena can be discovered / fixed in a close symbiotic relationship with each other.

2.3. Programme and modelling
The third step is a very challenging task that aims at formulating the multidisciplinary multicast research program. This process includes creation of the complex multi-object model of the investigated environment on macro- and microlevel and organization of concordance of methods and research toolkits of different scientific disciplines.

2.4. Risk estimation
The forth step includes the contextual analysis and estimation of risks and possible effects of researchers’ penetrations and the microenvironment in a short-term and long-term perspective.

2.5. Outsiders and locals: objects or subjects?
On the fifth step the project group has to evaluate the interdependence of the influence of people (scientists and locals) on the environment as an object of research, and the influence of the responsive environment on the quality and characteristics of the collected empirical data and on the logic of its’ interpretation and analyses.

2.6. Fragile components
The “soft intervention” approach presumes identification of the most fragile components of the environment and subtle and delicate processes that tend to transform and even break down completely in the course of their careless measurement and fixation.

2.6.1. For example: the identity structure of local people; cultural elements of everyday life and the type of housekeeping. Sampling of water, soil and radiation measurements and electromagnetic radiation in those places that are considered sacred among locals. The cooperation of scientists with local citizens creates a positive precedent of mutual aid and cooperation (e.g. transport, food, medical care), but can drastically change the migration routes, type of vehicles, the dominant transportation technologies, manufacturing technologies and methods of buildings construction.
2.7. **Trial phase**
The seventh step is concentrated on the launch of a "Soft intervention" trial program in the explored environment and the creation of a mobile team of intermediaries whose job is to minimize risks and reduce contrast impact on the natural and social environment of a microregion. This mobile team may consist of different specialists, such as economists, transport engineers, medical workers, teachers, anthropologists or ethnographers, representatives of local administrations, etc.

2.8. **Revealing interconnected phenomena**
While launching trial research program, it is possible to detect the interrelatedly changing natural and social features of the environment, for example: the state of the water, temperature extremes throughout the year, and the lifestyle of the local population, birth rate, life planning for young families. Such a long-term parallel monitoring will identify the key trends in mutual transformations in different layers and zones of environment to create a flexible multi-factor model of the studied object.

2.9. **Tracking the project implementation**
The last but not the least goal is to coordinate the process of monitoring and to launch the program of a «soft intervention» engaging researchers-intermediaries into this process. This requires coordination of research project with local people, regional administration, local authorities, representatives of large enterprises in the manufacturing and mining industries, tourism and transport services.

3. **Researchers versus decision makers: a dialogue or a battle?**
The second task, which can be carried out thanks to the formation of an interdisciplinary network SecNet and INTERACT - is the possibility of presenting the project with the participation of environmentalists, biologists, soil scientists, biochemists and many other researchers, including social anthropologists, in the language of administration staff at different levels and decision makers, the translation of the language of each scientific discipline in the language of project managers, officials, civil activists from among local residents, the language of the media.

In Russia, this becomes more than relevant, since erroneous interpretations lead to a false image of the research group and do not allow the project to reveal its full potential – both in the field of fundamental research and in the applied fields: economic planning, social policy, etc. But it is not enough to present separately the results of the thematic areas included in the interdisciplinary project, like a mechanical set of facts. It is necessary to communicate between areas of knowledge to find a “point of assembly” of data and its interpretation.

It seems to me that data should be compared and interfaced at the level of a large research team, and not, later, on the administrative level, on which decision makers are accumulating reports and data from different research projects, apply them and quote them ignoring the context. Today the issue of correct, timely and appropriate application of analytics based on scientific data is very acute for the academic community in Russia. Thus, assembling the project for presentation to the external environment and revealing the social significance of the results in an interdisciplinary perspective is another potential challenge for social anthropologist.

And, finally, it is necessary to make sure that the knowledge and data, facts and observations obtained in the study area are going to return back to the local community in a transformed, clear and simple form and, in some cases, even become an incentive for social action: it can be the process of Association of representatives of different genera and families of reindeer herders to solve infrastructure, educational, social problems, it can be the development of individual entrepreneurship in the tundra, this may be the choice of a more environmentally friendly or more technologically advanced mode of transport. But the most important thing is that when the local community receives up-to-date information about what is happening in the environment where they live, it gives them the opportunity to formulate a request: to the municipal and regional administration, to representatives of business structures, to oil and gas companies, to neighboring settlements, to the scientists. This type of information supports transparency with well-founded requests and grass-roots initiatives. And this, in
turn, launches a new round of research, already deeper, balanced, permeated with real problems, pain, risks, hopes of the inhabitants of the pan-Arctic zone.

4. Pilot research project: routes and history of idea

To date, the Russian complex research is an acute problem of establishing links between the results of research in the field of landscape science, ecology of biosystems, botanics, microbiology, chemistry and other natural science research projects and the results obtained by the methods of Humanities and social Sciences.

Despite the detailed and careful collection of empirical data in different microregions of the Arctic zone it can hardly be representational for the explored ecosystems or biota as well as for the local population. The weak point of every research inside strict disciplinary borders is the absence of correlation of socio-economical data with environmental and landscape monitoring, and therefore it becomes very hard to extrapolate conclusions at the level of specific regions of the Russian Arctic. Socio-anthropological studies may identify the reasons why local communities increase or, conversely, reduce the intensity of impacts on terrestrial ecosystems. Also, this approach is aimed at identifying the impact of traditional way of life transformation and nature management on the growth or reduction of damage risks that can arise in specific landscapes or elements of ecosystems. This field study was conducted under the auspices of the complex interdisciplinary grant “Comprehensive study of the vulnerable terrestrial ecosystems of the West-Siberian Arctic changes on the basis of a mega-profile approach”.

4.1. The main objectives and goals.

The strategic objectives of the project are the association of interdisciplinary and transdisciplinary approaches in research, the creation of a precedent parallel interconnected field studies and monitoring of representative areas in an explored area, the methods of natural sciences and humanities and association of the scientific potential of different regions of Russia for creation of favourable entry opportunities on a global level.

4.1.1. The concrete research goals are the following:

- disclosure of the insufficiently explored problem of the attitude of local population living in the Arctic zone to climate change [1] and transformation of terrestrial ecosystems, which are not only a habitat, but also a source of key resources that form the life support system of indigenous and non-indigenous communities [2];
- identification of ways of interaction of local administrations, the scientific community, management structures, enterprises with the local population through the broadcast of information on changes in ecosystems and climate [4] in the categories of everyday experience, in order to enhance their civic consciousness [See: 3] and social responsibility in carrying out various types of fishing, to reduce the risks of anthropogenic pressure on the territory;
- identification and systematization of strategies and tactics of adaptation of residents [7] to changing conditions to predict the nature of co-development of vulnerable ecosystems and local communities. The typology of adaptation strategies will make it possible to analyze how much support or control and regulation of these adaptation processes is needed from the Executive authorities or through the adjustment of legislation.

4.2. Methods

Socio-anthropological research in the framework of an interdisciplinary project involves a combination of three main methods at the field stage:

- conducting an observation to describe the structure of villages, nomad camps and other types of settlements in the area covered by the research, as well as the analysis of the way of life and daily life of local residents;
• conducting a survey of the population permanently residing or carrying out seasonal migration in the areas of the expedition (quantitative sociological research), in order to reflect the synchronous cross-section of socio-demographic characteristics of local residents and the range of the main problems they face;

• conducting semi-structured biographical and in-depth interviews with members of local communities focused on two key research topics. The first theme reveals the attitude of the local population to the changes taking place with fragile ecosystems and reshaping of the landscape in the area of residence communities, and the relationship of these changes with the processes of human impact on ecosystems [3]; the second theme aims to identify long-term strategies and everyday tactics of adaptation of local people to the changing climate and transforming the landscape [7].

4.2.1. The interviews with local people include the questions about their own observations about the visible and most serious climate and weather changes in the surrounding local area, according to their experience. The interview also aimed at asking the type and the way that climate changes manifest themselves? We also focused on the elements of the environment that have changed dramatically. Another set of questions was devoted to the revelation of adaptation processes of people living and migrating to the high North. We asked, whether these climate conditions comfortable for the locals and newcomers, was it easy for you to adapt or the adaptation was really stressful for them. The next block of questions was connected with an issue of changing lifestyles in Arctic, and the ways that climate change affected health, pace of life, livelihoods, working conditions, diet, leisure, and future planning. The most intricate question deals with the local interpretation and attitude to the tendencies of the global climatic changes as a whole.

5. Results of the pilot interdisciplinary project
As a result of the first field stage of the research conducted as part of a large-scale route expedition in the Tomsk region (Kargasok, Verticos, Lukashkin Yar), Khanty-Mansiysk district (Vata village, Agan settlement, Russkinskaya) and Yamal-Nenets Autonomous district (Vynapurovskij, Khanymej, Tarko-Sale, Urengoy, Pangody), it was possible to cover the entire area of rural settlements on the territory of the Ob region in the Arctic and pre-Arctic zones of Western Siberia. The criteria for the selection of settlements were as follows:

1. The history of the studied settlement is connected with the resettlement of the population from western and southern territories or with the formation of nomad camps and trading posts during the Russian Empire, or with the consolidation of settlements and the creation of trading posts, collective farms (kolkhoz) and settlements in the Soviet period before the "Gas-and-oil boom"
2. The population of the settlement is not more than 5000 people and it is not an urban-type settlement or city
3. Most of the residents have additional earnings and resources for survival due to gardening, husbandry, hunting, fishing and underworking.
4. Elements of the landscape such as swamps, river beds, lakes, forests surrounding the village have undergone significant changes over the past 30-50 years.
5. All settlements are located along the riverbed of the Ob river and form a monolithic infrastructure “corridor” of Western Siberia.
6. These points are located near the “control points” of the Siberian Mega-transect, where the state of water and soil is monitored, samples are regularly taken and which are reflected in long-term series of observations.

During the expedition we explored 9 villages and took interviews with the local dwellers travelling along the river Ob on the ferry between two districts, separated from each other.

As a result of collecting 300 questionnaires and 30 interviews on the perception of climate change and adaptation to the environment, we were able to identify key narratives of local residents about the place of man in the ecosystem, the impact of man and communities in general on vulnerable
landscapes and the reverse impact of natural factors on life in the local community in connection with global and local climate change.

An unexpected discovery that forced us to abandon the initial hypothesis about relationship between local and regional features of life support of certain local communities and their view of climate change in the region and in the world, was an incredibly diverse range of opinions and judgments about the trends of changes in the environment, ecosystem, weather conditions and climate in general. For example, regardless of the region, respondents selected one of four response options with equal frequency when assessing the main observed markers of climate change. Winds, according to the responses of local residents, are equally strengthened, weakened, and have not changed, as well as the duration of summer in their perception has different trends (either becoming shorter or longer or does not change). More obvious trends in the responses concerning winter temperatures (more than 52% believe that the winters have become warmer) also make us think about the correspondence of the recorded opinions to the true state of things. Therefore, in view of above results of a quantitative survey on the dynamics of markers of the state of the environment and climate from the perspective of local residents, we decided to turn to the interpretation of the results of qualitative data obtained during the interviews in selected settlements. The most perspective focus is the analysis of the discussion with informants on the existence of global and local climate change as such.

Some of the informants noted that they had not observed real climate change in their daily lives, but trusted reports in the media on statistical indicators and trends of climate change. Their opponents believe that not only there are no changes, but also information in the media is extremely “inflated” [See: 4]. Local residents who notice significant changes in the shape of the river bed, the amount of precipitation, temperature regimes of summer and winter period, the amount of natural resources in their area, however, tend to argue that global changes do not exist, and that these “fluctuations” are micro-deviations from the norm within the centuries-old natural macro-cycle.

It is also worth paying attention to another leitmotif of the interview discussing reasons of the ongoing climate change in the world, country, native region, according to informants. Responses and judgments in this area balance between two extremes: on the one hand, the narratives and explanatory models of local people represent paternalistic expectations and references to governments and extractive oil & gas companies responsible for the environment. On the other hand, some respondents talk about the need for personal responsibility for every action taken in everyday life: in their opinion, the individual contribution and caring for the ecology of the region is not just a way to express their civic position, but also a real force that can prevent the acceleration of climate change [5].

Thanks to this pilot field research, we have understood the serious limitations that exist in the study of climate change local interpretations from the standpoint of social anthropology and sociology. However, the advantage of this interdisciplinary project is the ability to adjust tools of the researcher and interpretative models, abstracting from the materials obtained using the methods of Humanities and conducting data verification, comparing them with the natural Sciences data, that show in a different optics climatic changes that occur or do not occur in Western Siberia.

Acknowledges
The work is carried out with the financial support of RFBR grant № 18-05-60264, and the government order of The Ministry of Education and Science of Russia, project № 5.4004.2017/4.6. We express gratitude to Large-scale research facilities «System of experimental bases located along the latitudinal gradient» for fruitful cooperation (http://ckp-rf.ru/usu/586718/).

References
[1] Hansen J, Sato M and Ruedy R 2012 Perception of climate change Proceedings of the National Academy of Sciences of the United States of America 109 14726-14727, E2415-E2423
[2] Ishaya S J, Abaje I B 2008 Indigenous people’s perception on climate change and adaptation strategies in Jema’a local government area of Kaduna State, Nigeria Journal of Geography and Regional Planning 1(8) 138-143
[3] Leiserowitz A 2006 Climate Change Risk Perception and Policy Preferences: The Role of Affect, Imagery, and Values Climatic Change 77 (1–2) 45–72
[4] Pasquaré F A, Oppizzi P 2012 How do the media affect public perception of climate change and geohazards? An Italian case study Global and Planetary Change 90–91 152-157
[5] Rattera B M W, Philipp K H I and Storch H 2012 Between hype and decline: recent trends in public perception of climate change Environmental Science & Policy 18 3-8
[6] Rebetez M 1996 Public expectation as an element of human perception of climate change Climatic Change 32(4) 495–509
[7] Semenza J C, Hall D E, Wilson D J, Bontempo B D, Sailor D J and George L A 2008 Public Perception of Climate Change: Voluntary Mitigation and Barriers to Behavior Change American Journal of Preventive Medicine 35(5) 479-487
[8] Weber E U 2010 What shapes perceptions of climate change? WIREs Climate Change 1(3) 332-342