# PROBLEM OF GLOBAL WARMING AND EMERGING PATTERNS OF GLOBAL CONSCIOUSNESS. INTERNATIONAL CASE STUDY.

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Abstract

Global climate changes are emerging factors in European landscapes. The article is not dealing with discussion concerns anthropogenic influence of global climate changes, we offer the other picture: how are information of global warming working in the perception of university students in three countries Czech Republic, New Zealand and United States of America. There is hypotheses concerns relatively independent phenomenon on geographical and social factors of "global consciousness" sharing with this empirical massive sample (near to 600 people) of University students. Results show this global consciousness like some waking-up phenomenon: 1. is hungry for the new and relevant information concerns global climate changes 2. is certain about just ongoing global climate changes which are largely negative 3. is active, taking responsibility for the anthropogenic background of global warming 4. is certain about the ethical role of individual in this process 5. is full of global environmental ethics as well as practical economic worries follows global warming.

## I. Introduction

### Historical overview

Emerging problem of global warming (GW) as a serious world problem has a relatively short history. The earliest notion that could be found is nearly one hundred years old. Svante Arrhenius, the Sweden chemical was the first person to predict the possibility of man-made global warming. Arrhenius (1896) and US geologist Thomas Crowder Chamberlain independently came to the conclusion that burning fossil fuels might cause global warming due to carbon dioxide emissions. Arrhenius was influenced by the work of others, including Joseph Fourier. Arrhenius used the infrared observations of the moon by Frank Washington Very and Samuel Pierpont Langley at the Allegheny Observatory in Pittsburgh to calculate the absorption of $CO_2$ and water vapour.

He estimated that a doubling of $CO_2$ would cause a temperature rise of 4 degrees Celsius. Arrhenius came so close to the most recent Intergovernmental Panel on Climate Change (IPCC) estimate. But anyway, it took nearly one hundred years when this problem started to be discussed seriously on international scope. Recent (2007) estimates from IPCC Assessment report place this value between 2 and 4.5 degrees.

The influential Intergovernmental Panel on Climate Change (IPCC) was established in the 1988. The main activity of the IPCC is to provide an assessment of the state of knowledge on climate change in regular intervals. The First IPCC Assessment Report was completed in 1990. The Report played an important role in establishing the Intergovernmental Negotiating Committee for a UN Framework Convention on Climate

Change by the UN General Assembly. Its Second Assessment Report, Climate Change 1995, provided key input to the negotiations, which led to the adoption of the Kyoto Protocol to the UNFCCC in 1997. The Third Assessment Report (TAR), Climate Change 2001, was completed in 2001. The IPCC has decided to continue to prepare comprehensive assessment reports and agreed to complete its Fourth Assessment Report in 2007.

At present global warming is rapidly emerging phenomenon discussed in many conferences and scientific journals. It is a serious target of international agreements and protocols as Kyoto is. This great interest all over the world and many practical steps which have been done on international policy and economic scene does not assure the uniform access of all researches and countries to this threat. Global warming could be perceived both as global threat as same as the natural consequence of geological history of our planet. Conservatives, skeptics, realists are the frequent labels of people adhered to optimism of Julian Simon (1996) that material conditions of human being will be increased without any limits and during two centuries all the countries reach the level of West today or higher. According these realist global warming is no the serious problem, if any, it is natural oscillation of climate history. This good news for economists is supported by Bjorn Lomborg (2001); even he must admit existence of global warming. The other way is if it does represent some serious global problem. For Lomborg of course does not. On the opposite site labeled as ecological or environmentalist we can find recently All Gore (2006) with his document An Inconvenient Truth. The best-documentary win of Oscar was a triumph of Gore after his loss in the 2000 US president election. Between these two radical opposite opinions exist a great number of intermediate levels of more or less similar views, tabloid and scribblers included dealing with perception of probable consequences of climate changes.

## II. Design of our hypotheses

Our international case study is not dealing with discussion concerns anthropogenic influence of global climate changes. We offer the other picture: how information of global climate changes is working in the perception of the university students in three countries - Czech Republic, New Zealand and United States of America. Sociological and economic focused studies show the social construction of environmental knowledge. Also the sociological literature focused on global environmental change emphasizes the processes by which the problem of global warming is socially constructed. On one hand global warming is a part of our socially constructed human world; on the other hand it does not mean the problem of global warming lies just on the subjectivity of some social movements and perceptions. Thinking about this problem we would like to stress the reaction of society on global warming like a core problem for the future way of development and influence of global changes. Despite of fact how much is global warming influenced and by man and how much is global ecosystem of biosphere resistant, the most important fact is and will be the "picture of perception" of global warming by future elite dealing with the business, science and politics. This is the first reason why we are focused on the opinion of the university students. The second reason lies on our hypothesis, briefly: the global problems like global warming requires some elements of global consciousness. Global consciousness is open thinking phenomenon relatively independent on geographic as well as social and political conditions.

There is no space enough for deep insight into philosophical problem of the category of global consciousness. Our hypothesis is based on the idea of general evolution growing from the evolution of species sensu Darwin (1859) to evolution of the entire system of

living sphere – biosphere - sensu Vernadskij (1988) to the evolution of the noosphere sensu de Chardin (1990). Allerd Stikker (1990) used the term global consciousness without any specific definitions just like a result of evolution of the Earth and its three spheres: geosphere, biosphere and noosphere. For our study we try to reflect two main characteristics of global consciousness derived from the idea of noosphere: 1. global consciousness as result of complexity, convergence and integrity (Stikker, p.172) should contains the same elements relatively independent of the limits of the place, i.e. demographic and culture facts. 2. Global consciousness is an emerging process dealing with real global problems influenced people despite of fact of their social conditions. Of course, this is far from Omega point of T. de Chardin. Our hypothesis is free of religious elements and give the people active role in creation of dynamic shape of global consciousness.

However, this is a great social, political and cultural question concerns possibilities of participation on the creation of global consciousness. This is the fact that every social survey of some active elements of global consciousness will be limited by access of survived sample to the global "infosphere". University students in developed countries seemed to be the ideal sample not only from methodological point of view, but there are one of the future active creators of global consciousness facing the global problems now. Global warming (GW) is not only a "celebrity" social problem (UNGARS, 1992) it is also problem going over the individual self-consciousness and requires relatively developed level of cooperation, coordination, international institutions etc., briefly GW is a challenge for global consciousness, too.

## III. Survey design

Our international survey "Opinions on Global Climate Changes" contains 13 sections of questions, no opened, slightly modified by countries (Celsius or Fahrenheit for example). We offered possibilities based on ICPP models of climate changes and possible threatens of the regions. All of these questions contain also level of impact or level of agreement usually 5 point scale and "no answer". However the design of our survey is not a primarily test of knowledge of ICPP or whatever models and hypotheses. It is stressed at the start: "There are no right or wrong answers to this survey—we simply want to hear what you are thinking. Please answer honestly and remember that your responses are anonymous". ICPP climate models served as a measurement of construction of the question "What is your opinion about the likely increase or decrease in average global temperature over the next fifty years." Used IS92a-f, scenarios predict annual global surface temperature will increase by 1-3.5°C by 2100, and that changes in the spatial and temporal patterns of precipitation would occur (ICPP, 1997, p. 7.). It is important to offer possibilities of decreasing as well as increasing temperature and go over this model; the last one offer went over 10º C (i.e. 18 F). In case of other questions i.e. human contribution to GW, possible kind of threats, temporal scale when some catastrophes connected with GW occur and possible motivation against GW are based on the ICPP sources (ICPP, 1997, and TGICA, 2005).

We try to avoid influences of some "right", "official" models on student's decision. What we are interested in is their own picture of global warming. Of course, many relationships to the infosphere exist, but methodologically speaking the ICPP models are the same nature of social (scientific) construct as students' opinions are.

The number of views and spectrum of dimensions connected with climate changes and their consequences reflects not just within research discussions, these differences are apparent also among countries. In case of concrete countries the situation is even more

complicated in terms of the role of country as a creator or receiver of these changes. In fact the most of so called developed countries are playing ambivalent role of creators and those who suffer from the consequences. The only differences could be found in the position of countries in terms of extension of their contribution. The sates differ in taking responsibility of GW. Unfortunately it is common situation that the biggest contributors are the less responsible states.

The situation described above reflects the complexity of global warming phenomenon the difficulty of its objective description or even making future prognoses of its impact with high level of credibility. Certain level of uncertainty connected with global warming is caused by its multidimensional character. There are at least four dimensions: Environmental, Ethical, Legal, and Economic. All these dimensions we try to make a component of our survey. As a background of our questionnaire served the package of the ICPP studies mentioned above as well as the most frequent questions, which are discussed in popular and research studies dealing with global warming. Our questionnaire could be divided into three main logical topics: Fear, Responsibility and Quality of information. These parts could be compared both from the point of view of different countries as same as among each topics.

In our case study we choose three countries in different position – Czech Republic (CZ), New Zealand (NZ) and the United State of America (USA). These countries could serve as representatives of three representative regions according IPCC (1997). These are Europe - constitutes the western part of the Eurasian continent. Its eastern boundary is formed by the Ural Mountains. Australasia - includes Australia, New Zealand and their outlying islands.

North America - region consists of Canada and the United States south of the Arctic Circle. Our criteria were to collect representative sample of significant differences in terms of:

a) How does the country contribute to climate change?

b) How does climate change affect the country?

c) How will the Kyoto Protocol coming into force affect by Country?

All of these criteria could serve as a background of the hypotheses concerns real elements of global consciousness, to test global consciousness as a relatively independent phenomenon on the regional and state facts.

Ad a) with all consideration to the simplification we used footprint indicator to compare our regions (see Table 1). The phrase "ecological footprint" is a metaphor used to depict the amount of land and water area a human population would hypothetically need to provide the resources required to support itself and to absorb its wastes, given prevailing technology. Gha means global hectares. The term was first coined in 1992 by Canadian ecologist from the University of British Columbia, William Rees.

**Tab. 1:** Footprints

| | Footprint | Portion of $CO_2$ in footprint |
|---|---|---|
| CZ | 4,9gha | 2,56 gha |
| NZ | 5,9 gha | 1,6 gha |
| USA | 9,8 gha | 5,68 gha |

Source: http://www.carbonfootprint.com

Ad b) Scientists involved in GW operate with the term vulnerability in the context of this question. Vulnerability is defined as the extent to which a natural or social system is

susceptible to sustaining damage from climate change. Under this framework, a highly vulnerable system would be one that is highly sensitive to modest changes in climate.

Europe: „Even though capabilities for adaptation in managed systems in many places in Europe are relatively well established, significant impacts of climate change still should be anticipated. Major effects are likely to be felt through changes in the frequency of extreme events and precipitation, causing more droughts in some areas and more river floods elsewhere. Effects will be felt primarily in agriculture and other water dependent activities. Boreal forest and permafrost areas are projected to undergo major change. Ecosystems are especially vulnerable due to the projected rate of climate change and because migration is hampered“ (ICPP, 1997, p.20).

Australasia: "Australia's relatively low latitude makes it particularly vulnerable to impacts on its scarce water resources and on crops growing near or above their optimum temperatures, whereas New Zealand's cooler, wetter, mid-latitude location may lead to some benefit through the ready availability of suitable crops and likely increases in agricultural production. In both countries, however, there is a wide range of situations where vulnerability is thought to be moderate to high, particularly in ecosystems, hydrology, coastal zones, human settlements and human health" (ICPP, 1997, p.19).

North America: "Many systems of North America are moderately to highly sensitive to climate change, and the range of estimated effects often includes the potential for substantial damages. The technological capability to adapt management of systems to lessen or avoid damaging effects exists in many instances. The ability to adapt may be diminished, however, by the attendant costs, lack of private incentives to protect publicly owned natural systems, imperfect information regarding future changes in climate and the available options for adaptation, and institutional barriers. The most vulnerable sectors and regions include long-lived natural forest ecosystems in the east and interior west; water resources in the southern plains; agriculture in the south-east and southern plains; human health in areas currently experiencing diminished urban air duality. Other sectors and sub-regions may benefit from opportunities associated with warmer temperatures or, potentially, from CO 2 fertilization, including west coast coniferous forests; some western rangelands; reduced energy costs for heating in the northern latitudes; reduced salting and snow-clearance costs; longer open-water seasons in northern channels and ports; and agriculture in the northern latitudes, the interior west and the west coast" (ICPP, 1997, p.23).

Eleven possible threats in our survey are derived from this regional vulnerability.

Ad c) Europe and CZ: In 2002, all fifteen then-members of the European Union deposited the relevant ratification paperwork at the UN. The EU produces around 22% of global greenhouse gas emissions, and has agreed to a cut, on average, by 8% from 1990 emission levels. In 2007, the European Commission announced plans for a European Union energy policy that included a unilateral 20% reduction in GHG emissions by 2020. Emission levels in CZ as a one of post-communistic countries who now are members of the EU have already been reduced by 8% as a result of its economic restructuring.

CZ data: Signature 23/11/98, Ratification, Acceptance AND Approval15/11/01, Entry into force16/02/05 (UN on Climate Change, 2006).

New Zealand: The Kyoto Protocol commits New Zealand to reducing its greenhouse gas emissions back to 1990 levels, on average, over the period 2008 to 2012 or to take responsibility for any emissions above this level if it cannot meet this target. As a result of the Kyoto Protocol and earlier climate change initiatives, the New Zealand Government has a range of programmes to reduce emissions already in place or being developed. The private sector is also engaged in this process.

New Zealand data: Signature 22/05/98, Ratification, Acceptance and Approval 19/12/02, Ratification with territorial exclusion of Tokelau). Entry into force 16/02/05 (UN on Climate Change, 2006).

US: The United States (U.S.), although a signatory to the Kyoto Protocol, has neither ratified nor withdrawn from the Protocol. The signature alone is symbolic, as the Kyoto Protocol is non-binding on the United States unless ratified. The United States was, as of 2005, the largest single emitter of carbon dioxide from the burning of fossil fuels. As of 2007, eight Northeastern US states are involved in the Regional Greenhouse Gas Initiative which is a state level emissions capping and trading program. It is believed that the state-level program will indirectly apply pressure on the federal government by demonstrating that reductions can be achieved without being a signatory of the Kyoto Protocol.

US data: Signature 12/11/98 (UN on Climate Change, 2006).

## IV. Sociological sample

No doubt the global problems require global solution. And sociological "look to the future" needs to dealing with the people who are prepared for the taking decisions, people who will be on the positions of decision makers, stakeholders, local, state and federal government, who will publish their opinion, who will teach other generation, briefly who are able to replace contemporary leaders. Many of them will come from universities. This is the first reason why we concern on the university students rather than on the representative sample of each state.

The second reason lies on the nature of our hypotheses. Elements of global consciousness require common access and active use of the infosphere. Picture of GW is the picture of the information access and ability to work with it. Find a relatively homogenous representative sample in each country with the relatively same information access is practically impossible apart from students.

Three groups of students were reviewed in three different countries Czech Republic (CR), New Zealand (NZ), and United States of America (USA). The number of respondent was approximately 200 of students in each country. The age of students was within the interval of twenty and thirty years. Age ratio was nearly balanced as same as the representation of subjects of study especially the rate between social and natural sciences. We try to keep the balance also in gender.

We tested the influence of gender, place of living, state, and discipline of study on the students' answers. In case of ordinal scale (Q 6, 7, 8) we used variance analysis, on the answers using categorical scale (modified Q 8, 9, 12, 13) we used Chi-quadrate test. In case of multidimensional answers (Q 10, 11) we used principle component analysis – PCA and redundant analysis - RDA analysis in Canoco program (Braak, Šmilauer, 1998).

## V. Results

The interpretation of our questionnaire will follow our logical division into three parts. Fear Responsibility and Information. Presented results follow the structure of our questionnaire.

*1. Fear of population in terms of GW impact*

This part of questionnaire was represented by following questions:

Q6. How do you rate your level of interest in GW change?

Q7. What is your opinion on likely increase or decrease of temperature within a period of next 50ty years?

Q8. If you believe catastrophes occur as a result of global climate changes, when do you think we will see them first appear?

Q10. A variety of claims have been made about the consequences of global climate changes. For each of the offered, use the scale to tell us your opinion as to how much negative impact, if any, you think these changes will have for your life.

**Tab. 2:** Interest in GW

| How would you rate your level of interest in global climate change? | | | | |
|---|---|---|---|---|
| Very | moderately | only a little | undecided | not interested |
| CZ | 81% | 6% | 11% | 2% |
| NZ | 71% | 12% | 11% | 6% |
| USA | 61% | 18% | 15% | 6% |

Source : Czech Carbo, 2006, n=571

Nearly three quarters of all reviewed students in each testing group expressed their interest in global climate changes. In Czech Republic the positive answer covered nearly 81% of respondents. This is a very actual problem in CR according responses of Czech students, it is a question hardly to be omitted. The answers of USA and NZ student are very similar or even identical - only 6% of respondents in both countries answered that they are not interested in GW.

**Tab. 3:** Likely change of temperature within next 50 years

| The likely increase or decease in overall global temperature over next 50 years | | | | |
|---|---|---|---|---|
| | | CZ | NZ | USA |
| Increase | 0,1- 2°C | 39% | 21% | 39% |
| | 2 - 4 °C | 36% | 23% | 22% |
| | 4 - 6 °C | 15% | 23% | 10% |
| Don t know | | 4% | 20% | 22% |
| Decrease | | 1% | 3% | 1% |
| No change | | 1% | 2% | 3% |

Source: Czech Carbo, 2006, n=571

Remark: The rest of % to fit the total of 100% are missing answers

All groups agree there will be likely increase of temperature up to 2 degrees of Celsius. Especially Czech and American students have relatively same opinion in the case of this temperature change. Nearly 40% of both groups anticipated this change as a very probable. Some differences occur in evaluation of higher increase between 2-4 degrees where especially NZ group pays a great value to this situation.

At this question interesting result seems to be a very low level of Czech undecided students stated “I do not know” in comparison with American and NZ ones. It could be caused by different cultural roots of Czech society. Czech people and especially students are more likely be reluctant to say I do not know as a synonym of their ignorance or low level of knowledge.

**Tab. 4:** Appearance of catastrophes as a result of climate change

| When we will see catastrophes as a result of global climate changes | | |
|---|---|---|
| | Don t know | have already appeared/within the next 5 yrs |
| CZ | 2% | 51% |
| NZ | 19% | 45% |
| USA | 21% | 31% |

Source: Czech Carbo, 2006, n=571 / Remark: selected data

This question gave our respondents the possibility to reveal their opinion if it differed from the previous offered interval of changes within 50 years. The majority of our respondents supposed that climate changes would appear within the horizon of five years, or they have already appeared. The most optimistic group seems to be students from USA, only 31% of them anticipated global warming within the period of 5 years. Changes or catastrophes anticipated in more distant time horizon are relatively uniform spread within the whole time period.

Varieties of claims have been made about the consequences of global warming. For each of the following, students used the given scale to express their opinion as to how much negative impact, if any, these changes would have for their life. The results we could see in table 5.

Czech sample differs from the USA and NZ ones not only in order of importance of individual changes but they put the higher valuation to the presented problems of global warming. From the first point of view it could be interpreted as a more sensitive approach of the Czech students. In comparison with USA and NZ students Czech ones undervalued the importance of economic consequences, they posed them at the end of scale while NZ and USA students gave the negative economic impact on the second place within the first group of disagreeable impact of GW

**Tab. 5:**. GW consequences (Order of importance 0-5)

| Order Czech Students | | Order NZ | | Order USA | |
|---|---|---|---|---|---|
| **Group 1** | | **Group 1** | | **Group 1** | |
| **Place** | **Changes** **Score** | **Place** | **Changes Score** | **Place** | **Changes Score** |
| 1. Decreasing drinking water resources | (water) 4,16 | 1. | (water) 3,95 | 1. | (water) 3,71 |
| 2. Increasing risk of sunbathing | (sunbathing) 3,79 | 2. | (costs) 3,71 | 2. | costs 3,53 |
| 3. Changing of drought and flood season | (flood) 3,58 | 3. | (disease) 3,16 | 3. | (flood) 3,23 |
| 4. Accelerated species extinction | (extinction) 3,39 | 4. | (flood) 3,13 | 4. | (disease) 3,51 |
| **Group 2** | | **Group 2** | | **Group 2** | |
| 5. Total change of scenery and landscape | (landscape) 3,36 | 5. | (landscape) 3,04 | 5. | (season) 3,05 |
| 6. Delay in changing of year's seasons | (season) 3,30 | 6. | (limits) 3,03 | 6. | (landscape) 2,96 |
| 7. Appearance of new diseases | (disease) 3,28 | 7. | (seasons) 3,03 | 7. | (limits) 2,95 |
| **Group 3** | | **Group 3** | | **Group 3** | |
| 8. Migration from endangered areas | (migration) 2,86 | 8. | (extinction) 2,91 | 8. | (extinction) 2,81 |
| 9. Increased economic costs | (costs) 2,76 | 9. | (tax) 2,90 | 9. | (sunbathing) 2,62 |
| 10. Implementing of a climate tax | (tax) 2,67 | 10. | (sunbathing) 2,86 | 10. | (migration) 2,59 |
| 11. Regulated limits on business activities | (limits) 2,52 | 11. | (migration) 2,74 | 11. | (tax) 2,56 |

Legend:

Black background/white letters: all are in accordance with placing importance of change in group and place

Grey background/black letters: all are in accordance with placing importance of change in group not place

Grey background/white letters: just two students groups are in accordance with location of change in a group

Without color: there is no accordance with place or group among all these three groups of studnets

*2. Responsibility*

The second part of our questionnaire labeled "responsibility" could be described in frame of following questions:

Q11 What is your opinion about the of your country reduction of $CO_2$ emissions on the level of global warming? What do you think about your personally contribution to decreasing global warming if you significantly reduce yours own level of $CO_2$ emission?

Q12 Which societal group do you believe could do the most to reduce $CO_2$ emissions and thus lower possible impacts of global warming?

Q13 In your opinion, what would be the best approach to decreasing $CO_2$ emissions?

**Tab. 6:** Influence of state on GW

| Do you agree that your country reduction of $CO_2$ has impact on global warming? | | | |
|---|---|---|---|
| | yes | do not agree | do not know |
| CZ | 67% | 27% | 6% |
| NZ | 38% | 41% | 20% |
| USA | 75% | 10% | 14% |

Source: Czech Carbo, 2006, n=571

Remark: The rest of % to fit the total of 100% are missing answers

The influence of country is strongly perceived by US students as same as the Czech ones, about 70% of respondents in each sample express their positive answer to our question. It seems that students of NZ are not aware of their country influence, 41% of them is persuaded that there is a very weak connection between their country economy and the reality of world climate. Only one third of the NZ students agree that their country has a strong impact on $CO_2$ emission of our planet.

**Tab. 7:** Personal influence on global warming

| Do you agree that you personally could influence global warming? | | | |
|---|---|---|---|
| | yes | do not agree | do not know |
| CR | 56% | 29% | 15% |
| NZ | 52% | 21% | 26% |
| USA | 47% | 27% | 25% |

Source: Czech Carbo, 2006, n=571

Remark: The rest of % to fit the total of 100% are missing answers

Personal responsibility is higher than responsibility of the state in case of NZ. In Czech Republic it is a little bit lower. What is interesting is the situation in USA where personal responsibility is nearly 30% lower than responsibility of the state. Is it a question of democracy? Does it mean that citizens could fully rely on state and its policy? There are awaked opened questions for discussion.

**Tab. 8:** The proper societal group to be addressed in case of decreasing global warming

| Which societal group do you believe could do the most to reduce $CO_2$ emissions? | | | |
|---|---|---|---|
| | businessmen | local authority | citizens |
| CZ | 59% | 13% | 27% |
| NZ | 59% | 29% | 8% |
| USA | 57% | 12% | 20% |

Source: Czech Carbo, 2006, n=571

Remark: The rest of % to fit the total of 100% are missing answers

There is a slightly difference between Czech and USA sample on one side and NZ sample on the other. While NZ students rely more on activity of local authority, Czech and USA students seems the businessmen the most proper group to be addressed in terms of global warming changes decrease.

**Tab. 9:** The best approach to decreasing $CO_2$ emissions

| What would be the best approach to decreasing $CO_2$ emissions? | | | | |
|---|---|---|---|---|
| CZ | law | economics | citizens | personal duty |
| CZ | 38% | 50% | 1% | 7% |
| NZ | 44% | 39% | 12% | 0% |
| USA | 45% | 34% | 4% | 16% |

Source: Czech Carbo, 2006, n=571
Remark: The rest of % to fit the total of 100% are missing answers (1%).

USA and NZ students believe in state regulation by law and control more than to economic instruments. Czech group differs a little, their trust in state regulation is not so strong. They preferred the economic pressure as the most effective way in decreasing negative influence of global warming.

*3. Information*

Q11. Is the amount of public information on $CO_2$ emissions and their impacts sufficient?

**Tab. 10:** Public information

| Level of agreement (%) | CZ | NZ | USA |
|---|---|---|---|
| Strongly agree | 3 | 3 | 6 |
| Somewhat agree | 17 | 13 | 13 |
| Undecided | 8 | 20 | 26 |
| Somewhat disagree | 39 | 39 | 39 |
| Strongly disagree | 33 | 21 | 15 |

In general could be said that level of information is felt as insufficient. Just quarter of addressed students in each sample is satisfied. This situation is alarming if we take into account that students belong to group of population which is dealing with information every day. May be they are too sensitive to this topic because of their reliability on them.

## VI. Discussion

Comparison of our results with the former or recent studies on GW or global changes perception is complicated by design of our survey. In CZ as well as in USA exists sociological scheme when GW or more general global changes included problem of global warming are compared with the other kind of values like family, job, house, healthy etc. No wonder, GW are regularly putted into last third of scale like this. (Kempton, 1991, CVVM, 2002). When we focused on the problems connected with GW we are witness of emerging interest about this new phenomenon. We full agree with Buttel and Tailor, (2002) that it is time to leave academic discussion about nature of social construct in problem of GW and unit of state like a crucial organization in this global process.

Very interesting every year repeated international study dealing with GW we can find on website of Asahi foundation (2006). The survey is labeled as “Questionnaire on Environmental Problems and the Survival of the Humankind”. There are results from the

1996 – 2006 and in every questionnaire is section Global Warming. The pool of respondents is international, but comparing with our study very diversified: Selected from members of GOs and NGOs in the databases of the United Nations Environment Program, United Nations Commission on Sustainable Development and The Asahi Glass Foundation. Each year, questionnaires are sent out in April with a return deadline of June.

Despite of facts of different survey design of studies mentioned above, there are some general common trends in the obtained answers: 1. GW is mainly caused by human activities, 2. expectation of increasing average global temperature over the next 10 – 50 – 100 years, 3. expectation of some natural threatens connected with GW, 4. expectation of some economic costs connected with GW, 5. expectation of some social threats connected with GW, 6. expectation of some (more or less rapid) political and/or technological solution, 7. international impact of state or regional solution and global context of thinking.

Comparing diversity of surveyed regions as to the influence and suffering from climate changes consequences, students' attitudes seems to be very coherent. These results seem to support our hypotheses about global consciousness or global knowledge system. Students represent a very sensitive group of society very tightly connected with work of all kind of information. It could be supposed they have an advantage of open minded analytical style of thinking they are trained for. The main focus of all kinds of studies should be to give students as much up date information as it is possible without any political dimension of interpretation. Students are a specific social group trained in work with information they could give them the value in case of broader circumstances- they are able to combine them within environment of different kind of science or research.

Thanks to global character of information that are available to all students there could grow up global character of knowledge crossing all over the world. This finding is more than promising. The character of our problems is global that is why they could be solved only under global consciousness. Only global knowledge could overcome the separate approach of state or nations and could find the way out of our problems.

Sure, there is interesting information for politics: not only level of the fear from global consequences (Tab. 5), but also temporal scale for decision (Tab. 4) and willingness to share some costs (Tab. 9). On the other hand mainly mentioned period of fife year when some catastrophes connected with GW occur is relatively short time to change nowadays economic systems, but appropriate period for postponing global problems. The interest about information concerns GW and global changes is enormous in all surveyed countries. It is likely independent on the social, cultural or geographical location.

Using RDA analysis (Tab. 10) in relevant question we got the results showing maximum of explicable variability less than 10% with combination of gender, country, location, and discipline, as regards variable by oneself, only the country crossing maximum level of 7%, other variables are about 1%. It shows how relatively independent on gender, country, discipline of study, and place of residence are more than 90% of answers. These could support hypotheses about emerging elements of global consciousness, too.

**Tab. 11:** RDA analysis of questions 10 and 11.

| Question | Analysis | Expository variables | Max. clarify variability (%) | p | Perfect clarify variability (%) | p |
|---|---|---|---|---|---|---|
| Q10 | I | gender, country, location, discipline | 4.5 | 0.002 | | |
| | II | country | 2.7 | 0.002 | 2.1 | 0.002 |
| | III | gender | n.s | | n.s. | |
| | IV | discipline | 1.1 | 0.002 | 0.6 | 0.008 |
| | V | location | 1.4 | 0.002 | 0.8 | 0.002 |
| | VI | country x gender | 3.6 | 0.002 | 0.6 | 0.014 |
| Q11 | I | gender, country, location, discipline | 9.3 | 0.002 | | |
| | II | country | 7.1 | 0.002 | 5.6 | 0.002 |
| | III | gender | 1.2 | 0.002 | 1.0 | 0.002 |
| | IV | discipline | 1.1 | 0.002 | 0.8 | 0.02 |
| | V | location | 0.9 | 0.022 | n.s. | |

Source : Czech Carbo, 2006, n=571, Canoco program

Interesting result is obtained view on landscape in GW. Despite of fact our survey was focused more general, results show that individual, personal feeling of familiar landscape threatens was in first half of all threatens even higher than some negative economic impacts. Landscape is taken into consideration like a natural place where we are witness of GW. The fear is more oriented on the underlying landscape forces like delay in changing of year's seasons, frequent changing of drought and flood seasons and accelerated species extinction. It is near to the fact, we are witness of waken global consciousness, going beyond the contemporary landscape stability and understanding what does it mean safety landscape.

## VII. Conclusions:

Our findings enabled us to make the following conclusions:

As to the anticipation of Global climate changes about half of our addressed respondents suppose that future increase of temperature within the period of 50ty will be about 4 degree of Celsius.

Future anticipated changes are perceived mostly as negative (40%-60%), about 30% of our respondents could not make a decision. What is interesting that there is a gap in concrete opinion how these GW will look like in concrete region where our respondents are from.

Czech students evidently differs from NZ and US students. On the second place following threat of drinking water appears the threat of environmental disaster, afterwards personal fitness and at the last place are the economic disadvantages. NZ and USA have quite different results on second place there are appeared changes in economic conditions in form of increasing cost of business due to the $CO_2$ increasing.

All respondents within our whole sample agree that the businessmen are the most influenced social group as to the responsibility of GW. In spite of this fact there is a high ratio of personal responsibility our cases considered to have.

Results show this global consciousness like some waking-up phenomenon: 1. is hungry for the new and relevant information concerns global climate changes 2. is certain about just ongoing global climate changes which are largely negative 3. is active, taking responsibility for the anthropogenic background of global climate changes 4. is certain about the ethical role of individual in this process 5. is full of global environmental ethics as well as practical economic worries follows GW.

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