



Attitude to climate changes in everyday management practice at the level of Kaliningrad region municipalities

Interim Report on the ECOSUPPORT BONUS+ project
"Advanced modeling tool for scenarios of the Baltic Sea
ECOsysteM to SUPPORT decision making" and RFBR Project
No 08-05-92421

K.V. Karmanov¹, B. V. Chubarenko¹, D. Domnin¹ and A. Hansson²

¹Atlantic Branch of P.P Shirhov Institute of Oceanology of Russian Academy of Sciences, Kaliningrad, Russia

²Linköping University, Centre for Climate Science and Policy Research, Linköping, Sweden
Linköping, Sweden

Front: Kaliningrad 2010

ISSN: 0283-7714 © SMHI

OCEANOGRAPHY No 104, 2010

Attitude to climate changes in everyday management practice at the level of Kaliningrad region municipalities

Interim Report on the ECOSUPPORT BONUS+ project "Advanced modelling tool for scenarios of the Baltic Sea ECOsystem to SUPPORT decision making" and RFBR Project № 08-05-92421

K.V. Karmanov¹, B. V. Chubarenko¹, D. Domnin¹ and A. Hansson²

¹Atlantic Branch of P.P Shirhov Institute of Oceanology of Russian Academy of Sciences, Kaliningrad, Russia

²Linköping University, Centre for Climate Science and Policy Research, Linköping, Sweden
Linköping, Sweden

Summary

A survey was conducted, based on a questionnaire developed within the projects ECOSUPPORT and BalticClimate. The respondents were representatives from municipalities in the Kaliningrad region. The answers showed that at the present time the climate related problems are not of high importance since other problems prevail, most of all – the socio-economic problems. Therefore the municipality management is performed without taking climate change into account despite the fact that many scientific institutions emphasize the problem of climate change and its consequences. Municipal development strategies were discussed and their relationship to climate change.

Sammanfattning

Representanter för kommuner i Kaliningradområdet deltog i en enkätundersökning där frågeformuläret var utformat inom projekten ECOSUPPORT och BalticClimate. Svarssammanställningen visade att för närvarande rankas inte klimatrelaterade problem nämnvärt högt eftersom andra typer av samhällsproblem överskuggar, framförallt problem av socioekonomisk karaktär. Av denna anledning bedrivs kommunernas politik utan att ta hänsyn till klimatförändringar, trots att många vetenskapliga institutioner framhåller klimatförändringsrelaterade problem och dess konsekvenser. Avslutningsvis diskuteras utvecklingsstrategier för kommunerna i Kaliningradområdet i ljuset av klimatförändringen.

Table of contents

1	INTRODUCTION.....	1
2	METHOD	1
3	RESULTS	2
4	DISCUSSION.....	10
5	CONCLUSIONS.....	11
6	ACKNOWLEDGEMENTS.....	11
7	REFERENCES.....	12
8	SMHI PUBLICATIONS	1

1 Introduction

By climate we understand the longstanding statistical weather regime typical for the particular area due to its geographical location (Evaluation report ..., 2008). Its impact on all areas of human life is massive and any significant climate change brings disturbances in established activities in most spheres of human life: industrial and civil construction, agriculture, population health, use of recreational and aqua-resources etc.

Climate change is one of the most important international problems of the XXI century which falls beyond the scope of Earth sciences and represents a complex interdisciplinary problem comprising ecological, economical and social aspects of stable areas' development (Instruction ..., 2009).

An important factor to provide public adaptation to climate change should be the initiative of governmental authorities. At present time the president of the Russian Federation D. Medvedev has shown an initiative in the given field: on December 17th of 2009 by the instruction № 861-rp of the president of Russian Federation D. Medvedev the «Climatic doctrine of Russian Federation» was adopted.

The expected climate changes will unavoidably affect human, plant and animal life conditions in all regions of the planet, and in some of regions they will become a perceived threat to prosperity and stable development of the population.

The mentioned factors predetermine the necessity of taking climate change into account as one of the key long-term security factor in the Russian Federation and bring forth the problem of global climate change in its national and international aspects to the number of priorities of Russian Federation policy. Since the consequences of climate change effect global, regional, sub-regional and national levels (Instruction ..., 2009), there is a need to take climate-change processes into account when planning the development of all branches of human life, in both the nearest and distant future, also at the level of local government. At the present moment the municipalities of Kaliningrad region are finding their positions on the subject of their long-term development strategic priorities. Strange though it may appear in the century of material and technical progress, climate conditions may affect the success of these strategies greatly (Evaluation report ..., 2008).

To determine the idea of climate change and their impact on human life a survey was conducted among municipal administration bodies, ecological monitoring and environmental management organizations in the Kaliningrad region. The survey was handed out to the management and staff of mentioned institutions.

2 Method

The questionnaire was developed at the University of Linköping (Sweden) as a part of the international project ECOSUPPORT (Advanced tool for scenarios of the Baltic Sea ECOSystem to SUPPORT decision making, see <http://www.baltex-research.eu/ecosupport>) and BalticClimate, during 2009-2011 of the BONUS+ program (<http://www.bonusportal.org>). Since the questions were obviously oriented to EU countries they were slightly adjusted to the Russian context.

The survey consisted of four question blocks (listed below).

The survey was held in a quasi-interactive mode during a joint meeting on 26 of February, 2010. The respondents answered the questions synchronously, one by one, while the possible answers, prepared by the organizers (as though on behalf of the municipality member responsible for the environmental tasks) were demonstrated on a screen. This was necessary in order to provide a correspondence between the respondents' answers and the given subject, and not to let them slip away into other fields of their interests. The provided answers made no considerable influence on the respondents' answers since it was found out during the questionnaire processing that they did not occur often. Answering the questions did not require deep knowledge of climate change.

In total, 31 people were included in the survey. All of them were members of the municipal administration or environmental management organizations. Three groups of occupations among the respondents were distinguished:

1. Municipality management, marketing, transport, territorial management, port activity control, management organizing, economic policy development, industrial policy, international relations and tourism, municipal property management, territorial development.
2. Environment conservation, ecological monitoring, management of natural resources (governmental ecological control in marine waters, hydro-chemical control, socio-hygienic monitoring, terrestrial control and ecological monitoring), complex coastal zone management, marine living and non-living resources control, environment control in sphere of water management, coastal zone monitoring.
3. Tourism (excursion and recreation management in Kaliningrad region, Europe, worldwide).

After the questionnaires were processed the answering statistics was prepared.

3 Results

Primarily, the main problems in the mentioned spheres from the respondents' point of view were identified, as well as which of them that are related to climate change. In the block №2 «Your opinion» it was suggested to the participants to state the problems of current interest and the ones that will be of current interest in 20 years.

The respondents included in the list of current problems such things as global financial crisis influence, problems concerned to the region's infrastructure imperfection (in particular, transport infrastructure problems), few small enterprises, poorly developed utility plants, water objects' pollution (in particular, pollution of the Baltic Sea by the vacationers of Vistula Lagoon), industrial capacity decrease, unemployment, increase of industrial plants number, bogginess of the lands (in the area of the Pissa River, due to the dams destruction), low skill level of personnel, low living standards of population, economical instability, Russian legislation imperfection, absence of environmental preservation methods within municipalities and lack of workplaces. All of these problems are not connected to climate change.

According to the opinion of the respondents the following problems may appear in 20 years: inundation of territories, depopulation, economic development lag, ecological situation decline, decrease of investment prospects of the region, skill level of personnel decrease, bank erosion,

social disaster, health deterioration of population, increase of industrial plants number and low living standards of population.

Among the problems in the sphere of municipality management the following groups of problem were distinguished by the respondents:

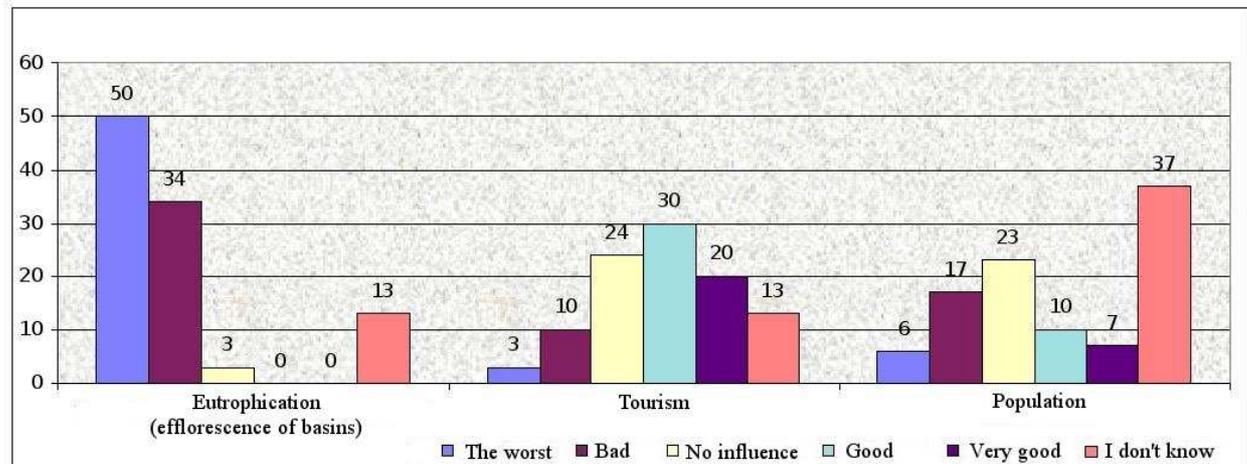
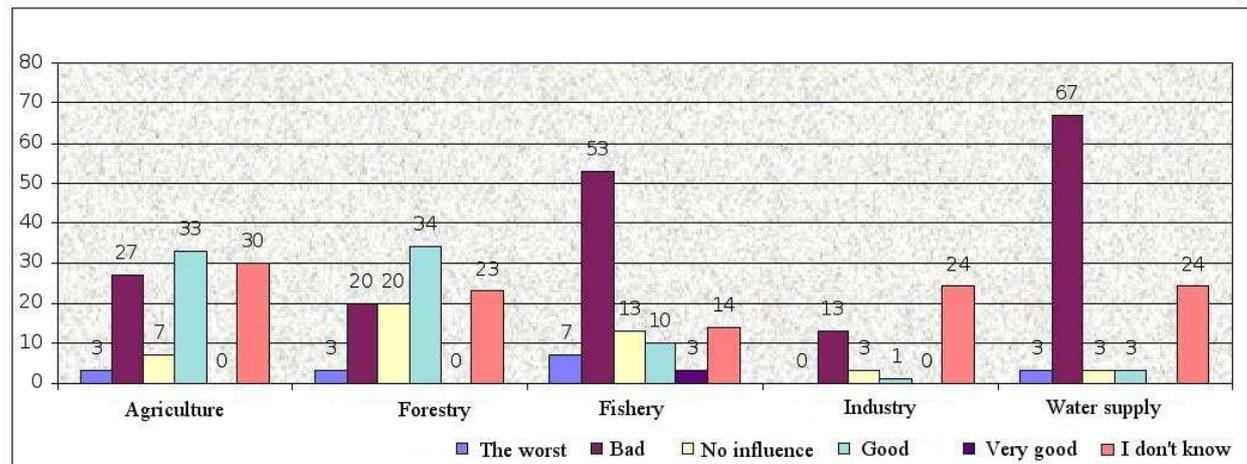
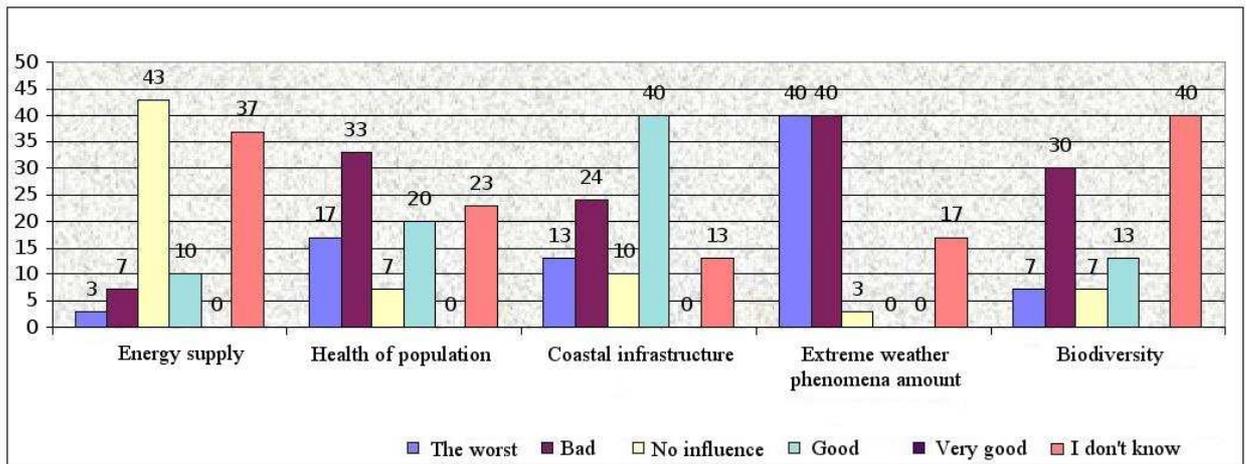
- problems of the poorly developed infrastructure in the region (first of all – the transport infrastructure)
- ecological problems (first of all – the pollution of the Baltic Sea and water objects, bogginess of the lands)
- socio-economic problems (depopulation, under-financing, legislation imperfection, low skill-level of personnel).

These groups not only characterize the up-to-date problems but the problems that may occur in 20 years by the respondents' opinion. Among all possible problems mentioned by the respondents, only coastal erosion, inundation of territories and soil degradation are concerned to climate-change processes.

When answering the question about the impact of climate change on the sphere of professional duties of each particular respondent the participants replied as following:

- 75% (23 persons) – said that climate change had an impact on their sphere of professional duties,
- 19% (6 persons) – said there was no impact,
- 6% (2 persons) – said they didn't know.

The questionnaire also contained the questions concerning the level of influence of climate change on different spheres of human life, such as industry, agriculture, fishery, etc. The answers are illustrated in the diagrams below (plotted in %).



Further the respondents were suggested to answer the question: «how serious are, in their opinion, the consequences of climate change currently and how serious they will be in 20 and 100 years». The answers represented a digit from 1 to 10, 1 meant there are (will be) no serious consequences, 10 – that there are (will be) major problems. Results for this block (they show how many respondents per cent that did chose the particular answer) are given in Fig. 2-Fig. 4.

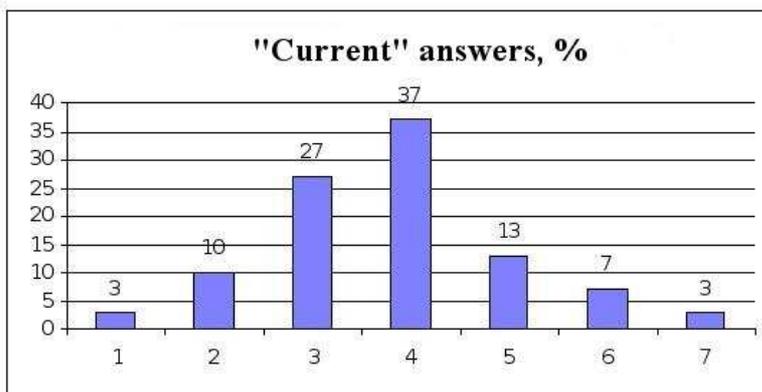


Fig. 2. Current number of problems connected with climate change.

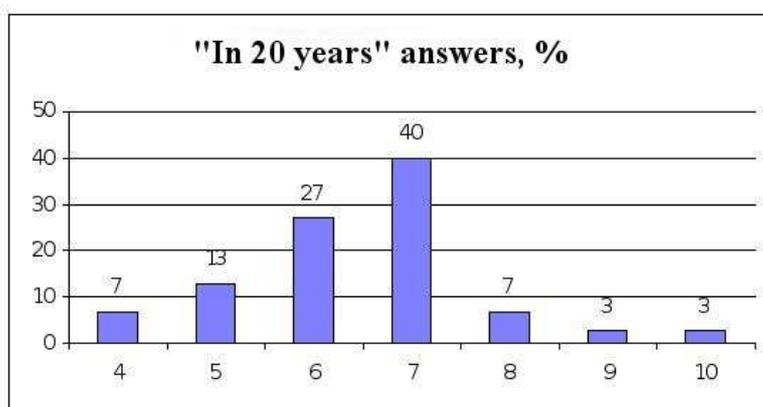


Fig. 3. Estimated number of serious problems connected with climate change in 20 years.

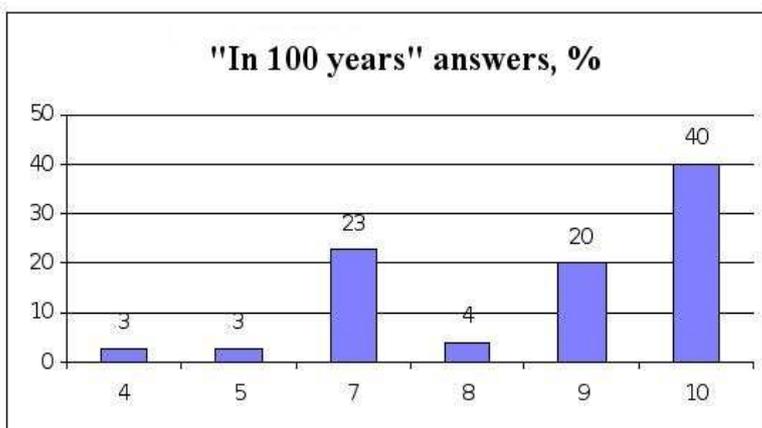


Fig. 4. Estimated number of serious problems connected with climate change in 100 years.

The objective of the next block «Your activity» was to estimate the level of influence, according to respondents, of climate change on their sphere of activities as well as respondents' awareness about different sources of obtaining information about climate conditions and climate change. Few kinds of such sources were proposed: scientific research and reports,

climate scenarios from National climate computer center, researchers, research companies, authorities, direction of organizations, Internet resources, mass media sources: local and national newspapers, television, educational classes, etc. The respondents were supposed to evaluate them indicating the level of usability and reliability of each source in their opinion.

According to the survey results it may be concluded that the most frequently used sources of climate change information are Internet and mass media. A little less frequently scientific/research, municipal authorities and science-based reports are used. The most trustworthy sources, according to the participants, are scientific/research reports, educational classes and Internet data.

With the help of the survey it was possible to identify which scientific knowledge respondents required in order to enhance the possibilities of stable management in the Kaliningrad region. Based on the survey the participants would use:

- more specific information about the field of interest
- data on the influence of climate change on agriculture
- regional scenario of climate change
- statistical and analytical data
- strategic forecasting of economic development
- environment change monitoring data
- ecological monitoring data
- standard exchange files of socio-hygienic monitoring
- Russian Federation stable development convention

When answering the question «What decisions and activities are of primary importance to manage stable development in your region?» the respondents gave the following answers:

- concurrence in the territories development
- increase of budget support
- regional infrastructure improvement
- cleaner production
- increase of the sea port appeal
- recreational development and financial improvement
- system approach to urban construction and development of small towns
- stable development strategy acceptance
- creating the reserves of generating capacity

- legible policy of natural resources control
- economical subjects stimulation to stable progress
- funding the treatment facilities construction
- ecological legislation observance
- water quality improvement
- different dedicated programs
- including the environment preserving arrangements in development strategies
- agricultural development
- development and modernization of HPU (Housing and Public Utilities)
- arranging the chain of SPNA (Special Protected Natural Areas)
- development of municipal plans of managing river basins
- municipal training of ecological specialists

The respondents think that the most efficient regional management in terms of global climate change in the first place requires statistical and the environment monitoring data. As for the measures to provide a stable development of the region, the respondents consider that the most important are those concerned with improvement and preservation of the environment by means of creating SPNAs, industry disposal improvement and increasing legislative pressure in the sphere of ecology.

In the last questionnaire block «Possible development scenarios» the respondents were given four hypothetical scenarios of future development of Kaliningrad region / Russia (A. Hansson) and were suggested to choose one scenario of region development in 2050 as the most believable and one as the most prosperous.

Scenario 1:

- 1.1. Ever increasing integration of the region into the world trade and into Europe.
- 1.2. Constant swell in population and unemployment level decrease.
- 1.3. The role of market and private enterprise strengthens, infrastructure and social services privatization takes place.
- 1.4. Strong economic growth.
- 1.5. The management is minimal, private and commercial spheres prevail.
- 1.6. High energetic expenses and growth of transport needs for people's and goods' carriages.
- 1.7. The population is concentrated on few developing territories.

Scenario 2:

- 2.1. Government sector is minimized and privatized, the market power grows. Weak system of social service.
- 2.2. Weak economic growth and high level of unemployment.
- 2.3. Major industrial companies prevail in regional and global policies.

- 2.4. Increase of local international conflicts number.
- 2.5. One's own values and guides dominate, "the fittest survive".
- 2.6. Increase of differences between the rich and the poor ones.
- 2.7. Depopulation.

Scenario 3:

- 3.1. Strong public sector, it tends to stable progress and balances between social and economic development.
- 3.2. Strong economic growth but not as strong as in Scenario 1.
- 3.3. Brand new international management focused on resolving global problems.
- 3.4. International agreements and laws play the significant role.
- 3.5. Public infrastructure is in good state and it is focused on railway and cycle transport.
- 3.6. Ecological tax reform.

Scenario 4:

- 4.1. Frequent economic crises.
- 4.2. Powerful local communities as a reaction to international instability.
- 4.3. Disintegration of political forces and decrease of regional and international coordination and control.
- 4.4. Private enterprise and independent growth.
- 4.5. Weak economic development and growth of shadow economy, high level of unemployment.
- 4.6. Weak public sector and minimal investments into infrastructure.
- 4.7. Standards of living are better in small towns than in big cities.

When answering the question about the most probable development in the region/country in 2050 the respondents' opinions divided equally between all the scenarios, including 20% of abstained participants. As for the most prosperous scenario 50% of the respondents chose the third one, 30% the first one and 6% the fourth one. Three participants abstained which was odd since we had expected all the respondents having clear opinions on the desired future. At the present time long term (5 to 16 years) development strategies are accepted in all municipalities of the Kaliningrad region. The main directions for the development are:

- Amber mining and processing
- Electric power industry
- Industrial production
- Agriculture
- Food industry
- Port and ground transportation
- Recreation and tourism
- Environmental preservation

Such drifts as tourism, agriculture, environmental preservation are directly connected to climate conditions and therefore the climate change will significantly influence them which in its turn will require adjustment of the development strategies.

For instance, 15 out of 22 municipalities in the Kaliningrad region, one way or another, connect their progress to agriculture (Table 1.). However, 30% of the respondents answered that they didn't know how the climate change would influence the agricultural sphere. Approximately an

equal number of respondents considered a positive or negative influence of climate change on agriculture as equally likely. The agricultural development strategy in municipalities does anyhow not take into account possible climate change on the territory of the Kaliningrad region (Fig. 1.).

Tourism is one of the main directions of socio-economic development of the Kaliningrad region included into the 15 municipalities' development strategies. Most of the respondents agreed that climate change will have positive consequences for the tourism development in the region (Fig. 1.). However, among the answers the large numbers of "don't know", "will not influence" and "negative" are present (Fig. 1.). Therefore the accepted tourism development strategy does not anyhow take into account possible climate change either.

Administrative unit	Strategic development direction							
	Amber mining and processing	Energetics	Industrial production	Agriculture	Food industry	Marine and ground transport	Recreation and tourism	Environment preservation
Kaliningrad UD			B			A	C	
Ladushkin UD							A	
Mamonovo UD			B			A	C	
Pionerskiy UD						A	B	
Svetliy UD			B			A		
Sovetsk UD			A					
Yantarny UD	A						B	
Bagrationovskiy MA				A			B	
Baltiyskiy MA			C	D		A	B	E
Gvardeyskiy MA			A	D	B	C	E	
Guryevskiy MA			A	C			B	D
Gusevskiy MA			A	B				
Zelenogradskiy MA			C	B		D	A	
Krasnoznamenskiy MA		C	B	A			D	
Nemanskiy MA		D	A	B			E	C
Nesterovskiy MA			B	A				
Ozerskiy MA				A				
Poleskiy MA				A	B			
Pravdinskiy MA				A				
Svetlogorskiy MA			B	C			A	
Slavskiy MA			B	A			C	
Chernyakhovskiy MA			C	B		A	D	
Kaliningrad region			III(5)	I(7)		II(6)		
Coastal municipalities				III(5)		I(5)	II(3)	
Inland municipalities			II(4)	I(4)		III(1)		
Popularity	1	2	15	15	2	8	15	3

Legend

A	1 st strategic direction	I(5)	development direction of 1 st priority (number of municipalities considering this direction 1 st strategic)
B	2 nd strategic direction	II(4)	development direction of 2 nd priority
C	3 rd strategic direction	III(3)	development direction of 3 rd priority
D	4 th strategic direction		coastal municipalities
E	5 th strategic direction		inland municipalities

Table 1. The strategies of municipalities regional development (Andriashkina & Domnin, 2009).

Such drift as environmental preservation is directly related to the climate. However, this is present in the strategy of three municipalities and cannot be considered as a good factor. Almost all human activities imply a load upon the environment and successful stable progress

of the territory requires measures to be taken in order to compensate the negative effects. Besides, due to the relatively small size of the Kaliningrad region the results of environmental preservation activities taken by a municipality may be negated by the load caused by its neighbors. That is why the strategies of all municipalities of the Kaliningrad region should contain environmental preservation strategies.

More than a half of municipalities in the Kaliningrad region are located by the coast, but none of them take into account the impact made by climate change on the coastal zone. Among the respondents it is considered that climate change will have positive effects on the regional coastal zone – 40 % of respondents think so (Fig. 1.).

One of the negative consequences of climate change is sea-level rise; the plot shows us average annual value of sea-level in Baltiysk for 15 years (Fig. 5).

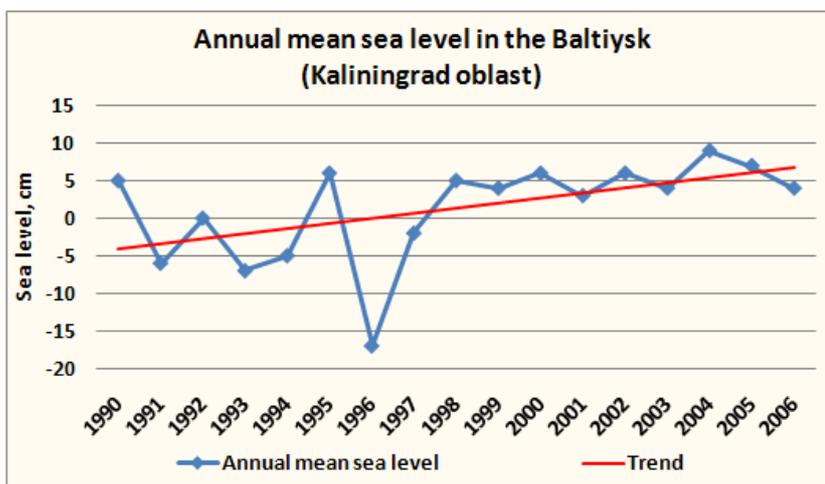


Fig. 5. Baltic sea-level in Baltiysk for 15 years (State of the Coast , 2009)

As one can see from the plot, in the period between 1990 and 2006 the sea-level rose by almost 10 cm. This trend will lead to increase of the coastal abrasion and therefore it is necessary to consider this when developing the region strategy, not only for the waterside municipalities but also for the districts with polder lands because the sea-level rise may lead to their inundation.

4 Discussion

For all the respondents the problems caused by climate change seem to be of secondary importance as they have to solve the problems connected with other spheres first. This is attested to by the list of the problems made according to respondents' answers. The most significant problems seem to be socio-economic aspects. Also, it may be noticed that the respondents' answers show very few differences between the current problems and the future ones. Climate change-related problems play a part only in two answers: coastal abrasion and inundation of territories, though a lot of problems related to climate change actually exist.

It is necessary to take changing climate conditions into account when projecting buildings, technical constructions, communications and means of transportation as well as when developing service instructions for them – this can increase the adaptation potential in economic sphere. To prevent possible breakdowns of pipeline transport it is essential to

reconsider downwards expected useful lives of underwater pipe reducers and to organize effective monitoring system of pipelines condition. To avoid basement underflooding, deformation and weakening caused by ground water raise it is necessary to arrange an investigation of monuments of the past and other important buildings and constructions in order to prepare and accomplish preservation measures for them, including measures of water regime management of under-flooded territories. To reduce damage caused by floods and to protect the population, the efforts should be focused on developing modern automated systems of forecasting and prevention of floods as well as on creation of basin anti-overflow security systems. Besides, land-use systems in the risk zones should be regularized and the regulatory framework defining legible responsibility of government authorities and municipalities administration for the floods' consequences should be improved (Evaluation report ..., 2008).

When answering questions regarding climate change impact on different spheres of human life, industry and agriculture, the number of “don't know” answers is high (Fig. 2.). This shows the respondents' lack of familiarity with climate change matters and how they affect different spheres of human activity despite the fact that evaluation reports on the subject of climate change and its consequences on the territory of Russian Federation are available. One can also notice a certain scatter of opinions regarding climate change impact on human activities. This is most likely a sign of lack of conceptualization of climate change and its consequence (Fig. 1.).

The reason for the absence of distinct conceptions of climate change and its consequences is, most probably, a result of the overshadowing effort of solving more urgent short-term problems not related to climate change. Still this problem one way or another evokes concern and the results of the survey strengthen this notion e.g. by the respondents' expressed wish to possess scientific data regarding climate change and its consequences.

The development strategies chosen by municipalities in the Kaliningrad region do not only ignore the trends of climate change but practically do not focus on nature preservation at all, although it is essential for the stable development in both particular districts and the extended region. Only three municipalities (Table 1.) have nature preservation trends in their long term progress plans. However, most of the respondents agree that climate change actually causes problems and that the number of such problems will eventually increase (Figs. 2-4).

5 Conclusions

At present time the climate change-related problems are not even close to be considered to be of high importance since other problems prevail, most of all – the socio-economic problems. Therefore the municipality management is performed without taking climate change into account despite the fact that many scientific institutions emphasize the problems of climate change and its consequences. For the public involvement and, first of all, management involvement in the climate change problem, the development of climate change scenarios for each region and the descriptions of both local and global consequences are necessary. As a result of the discussion we claim that it is necessary to hold special classes and explanatory work among the municipal authority staff members and specialists involved in nature preservation activities and environmental control. This is essential in order to provide a stable development in the Kaliningrad region even under the conditions of climate change.

6 Acknowledgements

This study is part of the project ECOSUPPORT (Advanced modeling tool for scenarios of the Baltic Sea ECOSystem to SUPPORT decision making, see www.baltex-

research.eu/ecosupport), one of the 16 funded projects within the BONUS+ program (<http://www.bonusportal.org>). Financial support from RFBR, grant “Modern toolkit of modeling the scenarios of Baltic ecosystem development for decision support” № 08-05-92421, is acknowledged. Authors appreciate valuable remarks of Markus Meier and efforts of Anna Shishova in translation of the text into English.

7 References

Andriashkina. A., Domnin D. Development strategies for municipalities of the Kaliningrad oblast (south-eastern Baltic) with relation of the climate change /Witkovski A., Yarff J., Isemer H-J. (Ed.). Intern. Conference on Climate Change the environmental and socio-economic response in the southern Baltic region: Confer. Proceedings. – Szczecin: Int. BALTEX Secretar. ISSN 1681-6471. Public.№. 42, 2009.

Evaluation report on climate change and its consequences on the territory of Russian Federation. General summary. M: SI «Russian national Scientific-Research Institute of Hydro-Meteorological Information - the World Center of Data», 2008.

Instruction of the president of Russian Federation about the climatic doctrine of Russian Federation on December, 17 of 2009.

State of the Coast of the South East Baltic: an indicators-based approach to evaluating sustainable development in the coastal zone of the South East Baltic Sea. / C. Gilbert (Ed.) Drukamia WL, Gdansk, 2008. 164 p. (authors: I. Bagdanaviciute, N. Blazauskas, A. Brzezinska, B. Chubarenko, A. Cieslak, I. Dailidienne, D. Domnin, J. Gajewski, S. Gulbinskas, M. Kalas, M. Matczak, J. Mikelenaitė, R. Mileriene, K. Rybka, A. Staskiewicz, I. Stawicka, K. Szeffler, E. Visakavicius)

8 SMHI Publications

SMHI publish seven reportseries. Three of these, the R-series, are intended for international readers and are in most cases written in English. For the others the Swedish language is used.

Name of the series	Published since
RMK (Report Meteorology and Climatology)	1974
RH (Report Hydrology)	1990
RO (Report Oceanography)	1986
METEOROLOGI	1985
HYDROLOGI	1985
OCEANOGRAFI	1985
KLIMATOLOGI	2009

I serien OCEANOGRAFI har tidigare utgivits:

- | | | | |
|---|--|----|---|
| 1 | Lennart Funkquist (1985)
En hydrodynamisk modell för spridnings-
och cirkulationsberäkningar i Östersjön
Slutrapport. | 9 | Barry Broman (1986)
Oceanografiska stationsnät - Svenskt
Vattenarkiv. |
| 2 | Barry Broman och Carsten Pettersson.
(1985)
Spridningsundersökningar i yttre fjärden
Piteå. | 10 | - |
| 3 | Cecilia Ambjörn (1986).
Utbyggnad vid Malmö hamn; effekter för
Lommabuktens vattenutbyte. | 11 | Cecilia Ambjörn (1987)
Spridning av kylvatten från
Öresundsverket |
| 4 | Jan Andersson och Robert Hillgren (1986).
SMHI:s undersökningar i Öregrundsgrepen
perioden 84/85. | 12 | Bo Juhlin (1987)
Oceanografiska observationer utmed
svenska kusten med kustbevakningens
fartyg 1986. |
| 5 | Bo Juhlin (1986)
Oceanografiska observationer utmed
svenska kusten med kustbevakningens
fartyg 1985. | 13 | Jan Andersson och Robert Hillgren (1987)
SMHI:s undersökningar i Öregrundsgrepen
1986. |
| 6 | Barry Broman (1986)
Uppföljning av sjövärmepump i Lilla
Värtan. | 14 | Jan-Erik Lundqvist (1987)
Impact of ice on Swedish offshore
lighthouses. Ice drift conditions in the area
at Sydostbrotten - ice season 1986/87. |
| 7 | Bo Juhlin (1986)
15 års mätningar längs svenska kusten med
kustbevakningen (1970 - 1985). | 15 | SMHI/SNV (1987)
Fasta förbindelser över Öresund -
utredning av effekter på vattenmiljön i
Östersjön. |
| 8 | Jonny Svensson (1986)
Vågdata från svenska kustvatten 1985. | 16 | Cecilia Ambjörn och Kjell Wickström
(1987)
Undersökning av vattenmiljön vid
utfyllnaden av Kockums varvsbassäng. |

- Slutrapport för perioden
18 juni - 21 augusti 1987.
- 17 Erland Bergstrand (1987)
Östergötlands skärgård - Vattenmiljön.
- 18 Stig H. Fonselius (1987)
Kattegatt - havet i väster.
- 19 Erland Bergstrand (1987)
Recipientkontroll vid Breviksnäs
fiskodling 1986.
- 20 Kjell Wickström (1987)
Bedömning av kylvattenrecipienten för ett
kolkraftverk vid Oskarshamnsverket.
- 21 Cecilia Ambjörn (1987)
Förstudie av ett nordiskt modellsystem för
kemikaliespridning i vatten.
- 22 Kjell Wickström (1988)
Vågdata från svenska kustvatten 1986.
- 23 Jonny Svensson, SMHI/National Swedish
Environmental Protection Board (SNV)
(1988)
A permanent traffic link across the
Öresund channel - A study of the hydro-
environmental effects in the Baltic Sea.
- 24 Jan Andersson och Robert Hillgren (1988)
SMHI:s undersökningar utanför Forsmark
1987.
- 25 Carsten Peterson och Per-Olof Skoglund
(1988)
Kylvattnet från Ringhals 1974-86.
- 26 Bo Juhlin (1988)
Oceanografiska observationer runt svenska
kusten med kustbevakningens fartyg 1987.
- 27 Bo Juhlin och Stefan Tobiasson (1988)
Recipientkontroll vid Breviksnäs
fiskodling 1987.
- 28 Cecilia Ambjörn (1989)
Spridning och sedimentation av tippat
lermaterial utanför Helsingborgs
hamnråde.
- 29 Robert Hillgren (1989)
SMHI:s undersökningar utanför Forsmark
1988.
- 30 Bo Juhlin (1989)
Oceanografiska observationer runt svenska
kusten med kustbevakningens fartyg 1988.
- 31 Erland Bergstrand och Stefan Tobiasson
(1989)
Samordnade kustvattenkontrollen i
Östergötland 1988.
- 32 Cecilia Ambjörn (1989)
Oceanografiska förhållanden i Brofjorden i
samband med kylvattenutsläpp i
Trommekilen.
- 33a Cecilia Ambjörn (1990)
Oceanografiska förhållanden utanför
Vendelsöfjorden i samband med kylvatten-
utsläpp.
- 33b Eleonor Marmefelt och Jonny Svensson
(1990)
Numerical circulation models for the
Skagerrak - Kattegat. Preparatory study.
- 34 Kjell Wickström (1990)
Oskarshamnsverket - kylvattenutsläpp i
havet - slutrapport.
- 35 Bo Juhlin (1990)
Oceanografiska observationer runt svenska
kusten med kustbevakningens fartyg 1989.
- 36 Bertil Håkansson och Mats Moberg (1990)
Glommaälvens spridningsområde i nord-
östra Skagerrak
- 37 Robert Hillgren (1990)
SMHI:s undersökningar utanför Forsmark
1989.
- 38 Stig Fonselius (1990)
Skagerrak - the gateway to the North Sea.
- 39 Stig Fonselius (1990)
Skagerrak - porten mot Nordsjön.
- 40 Cecilia Ambjörn och Kjell Wickström
(1990)
Spridningsundersökningar i norra
Kalmarsund för Mönsterås bruk.

- 41 Cecilia Ambjörn (1990)
Strömningsteknisk utredning avseende utbyggnad av gipsdeponi i Landskrona.
- 42 Cecilia Ambjörn, Torbjörn Grafström och Jan Andersson (1990)
Spridningsberäkningar - Klints Bank.
- 43 Kjell Wickström och Robert Hillgren (1990)
Spridningsberäkningar för EKA-NOBELS fabrik i Stockviksverken.
- 44 Jan Andersson (1990)
Brofjordens kraftstation - Kylvattensspridning i Hanneviken.
- 45 Gustaf Westring och Kjell Wickström (1990)
Spridningsberäkningar för Höganäs kommun.
- 46 Robert Hillgren och Jan Andersson (1991)
SMHIs undersökningar utanför Forsmark 1990.
- 47 Gustaf Westring (1991)
Brofjordens kraftstation - Kompletterande simulering och analys av kylvattensspridning i Trommekilen.
- 48 Gustaf Westring (1991)
Vågmätningar utanför Kristianopel - Slutrapport.
- 49 Bo Juhlin (1991)
Oceanografiska observationer runt svenska kusten med kustbevakningens fartyg 1990.
- 50A Robert Hillgren och Jan Andersson (1992)
SMHIs undersökningar utanför Forsmark 1991.
- 50B Thomas Thompson, Lars Ulander, Bertil Håkansson, Bertil Brusmark, Anders Carlström, Anders Gustavsson, Eva Cronström och Olov Fäst (1992).
BEERS -92. Final edition.
- 51 Bo Juhlin (1992)
Oceanografiska observationer runt svenska kusten med kustbevakningens fartyg 1991.
- 52 Jonny Svensson och Sture Lindahl (1992)
Numerical circulation model for the Skagerrak - Kattegat.
- 53 Cecilia Ambjörn (1992)
Isproppsförebyggande muddring och dess inverkan på strömmarna i Torneälven.
- 54 Bo Juhlin (1992)
20 års mätningar längs svenska kusten med kustbevakningens fartyg (1970 - 1990).
- 55 Jan Andersson, Robert Hillgren och Gustaf Westring (1992)
Förstudie av strömmar, tidvatten och vattenstånd mellan Cebu och Leyte, Filippinerna.
- 56 Gustaf Westring, Jan Andersson, Henrik Lindh och Robert Axelsson (1993)
Forsmark - en temperaturstudie. Slutrapport.
- 57 Robert Hillgren och Jan Andersson (1993)
SMHIs undersökningar utanför Forsmark 1992.
- 58 Bo Juhlin (1993)
Oceanografiska observationer runt svenska kusten med kustbevakningens fartyg 1992.
- 59 Gustaf Westring (1993)
Isförhållandena i svenska farvatten under normalperioden 1961-90.
- 60 Torbjörn Lindkvist (1994)
Havsområdesregister 1993.
- 61 Jan Andersson och Robert Hillgren (1994)
SMHIs undersökningar utanför Forsmark 1993.
- 62 Bo Juhlin (1994)
Oceanografiska observationer runt svenska kusten med kustbevakningens fartyg 1993.
- 63 Gustaf Westring (1995)
Isförhållanden utmed Sveriges kust - isstatistik från svenska farleder och

- farvatten under normalperioderna 1931-60 och 1961-90.
- 64 Jan Andersson och Robert Hillgren (1995) SMHIs undersökningar utanför Forsmark 1994.
- 65 Bo Juhlin (1995) Oceanografiska observationer runt svenska kusten med kustbevakningens fartyg 1994.
- 66 Jan Andersson och Robert Hillgren (1996) SMHIs undersökningar utanför Forsmark 1995.
- 67 Lennart Funkquist och Patrik Ljungemyr (1997) Validation of HIROMB during 1995-96.
- 68 Maja Brandt, Lars Edler och Lars Andersson (1998) Översvämningar längs Oder och Wisla sommaren 1997 samt effekterna i Östersjön.
- 69 Jörgen Sahlberg SMHI och Håkan Olsson, Länsstyrelsen, Östergötland (2000). Kustzonmodell för norra Östergötlands skärgård.
- 70 Barry Broman (2001) En vågatlas för svenska farvatten.
Ej publicerad
- 71 **Vakant – kommer ej att utnyttjas!**
- 72 Fourth Workshop on Baltic Sea Ice Climate Norrköping, Sweden 22-24 May, 2002 Conference Proceedings
Editors: Anders Omstedt and Lars Axell
- 73 Torbjörn Lindkvist, Daniel Björkert, Jenny Andersson, Anders Gyllander (2003) Djupdata för havsområden 2003
- 74 Håkan Olsson, SMHI (2003) Erik Årnefelt, Länsstyrelsen Östergötland Kustzonssystemet i regional miljöanalys
- 75 Jonny Svensson och Eleonor Marmefelt (2003) Utvärdering av kustzonmodellen för norra Östergötlands och norra Bohusläns skärgårdar
- 76 Eleonor Marmefelt, Håkan Olsson, Helma Lindow och Jonny Svensson, Thalassos Computations (2004) Integrerat kustzonssystem för Bohusläns skärgård
- 77 Philip Axe, Martin Hansson och Bertil Håkansson (2004) The national monitoring programme in the Kattegat and Skagerrak
- 78 Lars Andersson, Nils Kajrup och Björn Sjöberg (2004) Dimensionering av det nationella marina pelagialprogrammet
- 79 Jörgen Sahlberg (2005) Randdata från öppet hav till kustzonmodellerna (Exemplet södra Östergötland)
- 80 Eleonor Marmefelt, Håkan Olsson (2005) Integrerat Kustzonssystem för Hallandskusten
- 81 Tobias Strömgren (2005) Implementation of a Flux Corrected Transport scheme in the Rossby Centre Ocean model
- 82 Martin Hansson (2006) Cyanobakterieblomningar i Östersjön, resultat från satellitövervakning 1997-2005
- 83 Kari Eilola, Jörgen Sahlberg (2006) Model assessment of the predicted environmental consequences for OSPAR problem areas following nutrient reductions
- 84 Torbjörn Lindkvist, Helma Lindow (2006) Fyrskeppsdata. Resultat och bearbetningsmetoder med exempel från Svenska Björn 1883 – 1892
- 85 Pia Andersson (2007) Ballast Water Exchange areas – Prospect of designating BWE areas in the Baltic Proper
- 86 Elin Almroth, Kari Eilola, M. Skogen, H. Sjøiland and Ian Sehested Hansen

- (2007)
The year 2005. An environmental status report of the Skagerrak, Kattegat and North Sea
- 87 Eleonor Marmefelt, Jörgen Sahlberg och Marie Bergstrand (2007)
HOME Vatten i södra Östersjöns vattendistrikt. Integrerat modellsystem för vattenkvalitetsberäkningar
- 88 Pia Andersson (2007)
Ballast Water Exchange areas – Prospect of designating BWE areas in the Skagerrak and the Norwegian Trench
- 89 Anna Edman, Jörgen Sahlberg, Niclas Hjerdt, Eleonor Marmefelt och Karen Lundholm (2007)
HOME Vatten i Bottenhavets vattendistrikt. Integrerat modellsystem för vattenkvalitetsberäkningar
- 90 Niclas Hjerdt, Jörgen Sahlberg, Eleonor Marmefelt och Karen Lundholm (2007)
HOME Vatten i Bottenhavets vattendistrikt. Integrerat modellsystem för vattenkvalitets-beräkningar
- 91 Elin Almroth, Morten Skogen, Ian Sehested Hansen, Tapani Stipa, Susa Niiranen (2008)
The year 2006
An Eutrophication Status Report of the North Sea, Skagerrak, Kattegat and the Baltic Sea
A demonstration Project
- 92 Pia Andersson, editor and co-authors Bertil Håkansson*, Johan Håkansson*, Elisabeth Sahlsten*, Jonathan Havenhand**, Mike Thorndyke**, Sam Dupont** * Swedish Meteorological and Hydrological Institute ** Sven Lovén, Centre of Marine Sciences (2008)
Marine Acidification – On effects and monitoring of marine acidification in the seas surrounding Sweden
- 93 Jörgen Sahlberg, Eleonor Marmefelt, Maja Brandt, Niclas Hjerdt och Karen Lundholm (2008)
HOME Vatten i norra Östersjöns vattendistrikt. Integrerat modellsystem för vattenkvalitetsberäkningar.
- 94 David Lindstedt (2008)
Effekter av djupvattenomblandning i Östersjön – en modellstudie
- 95 Ingemar Cato*, Bertil Håkansson**, Ola Hallberg*, Bernt Kjellin*, Pia Andersson**, Cecilia Erlandsson*, Johan Nyberg*, Philip Axe** (2008)
*Geological Survey of Sweden (SGU)
**The Swedish Meteorological and Hydrological Institute (SMHI)
A new approach to state the areas of oxygen deficits in the Baltic Sea
- 96 Kari Eilola, H.E. Markus Meier, Elin Almroth, Anders Höglund (2008)
Transports and budgets of oxygen and phosphorus in the Baltic Sea
- 97 Anders Höglund, H.E. Markus Meier, Barry Broman och Ekaterini Kriezi (2009)
Validation and correction of regionalised ERA-40 wind fields over the Baltic Sea using the Rossby Centre Atmosphere model RCA3.0
- 98 Jörgen Sahlberg (2009)
The Coastal Zone Model
- 99 Kari Eilola (2009)
On the dynamics of organic nutrients, nitrogen and phosphorus in the Baltic Sea
- 100 Kristin I. M. Andreasson (SMHI), Johan Wikner (UMSC), Berndt Abrahamsson (SMF), Chris Melrose (NOAA), Svante Nyberg (SMF) (2009)
Primary production measurements – an intercalibration during a cruise in the Kattegat and the Baltic Sea
- 101 K. Eilola, B. G. Gustafson, R. Hordoir, A. Höglund, I. Kuznetsov, H.E.M. Meier T. Neumann, O. P. Savchuk (2010)
Quality assessment of state-of-the-art coupled physical-biogeochemical models in hind cast simulations 1970-2005
- 102 Pia Andersson (2010)
Drivers of Marine Acidification in the Seas Surrounding Sweden
- 103 Jörgen Sahlberg, Hanna Gustavsson (2010)
HOME Vatten i Mälaren

104 K.V Karmanov., B.V Chubarenko,
A Hansson (2010)
Recording of local climatic changes in
everyday management practice at the level
of Kaliningrad region municipalities



Swedish Meteorological and Hydrological Institute
SE 601 76 NORRKÖPING
Phone +46 11-495 80 00 Telefax +46 11-495 80 01

ISSN 0283-7714

