

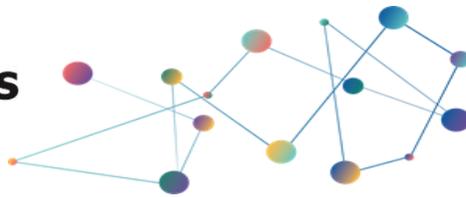
## Book of Poster Abstracts

Co-organized by the Russian Academy of Sciences (RAS), Russian Foundation for Basic Research (RFBR), International Institute for Applied Systems Analysis (IIASA), the Committee on Data of the International Science Council (CODATA), National University of Science and Technology MISIS (NUST MISIS), Austrian IIASA Committee at the Austrian Academy of Sciences (ÖAW), and the Finnish Committee for IIASA, with the support from the Systems Analysis Committee of RAS (KSA RAS) and the Geophysical Center of RAS (GC RAS).

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**Format:** Hybrid event (virtual and physical participation)

**Date:** 13-15 April 2021



## Conference Poster Abstract Review Committee



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Secretary, Austrian National Member Organization for IIASA; Assistant to the Chair of the Commission for Interdisciplinary Ecological Studies, Austrian Academy of Sciences; President elect, Division on Energy, Resources and the Environment, European Geosciences Union (EGU)



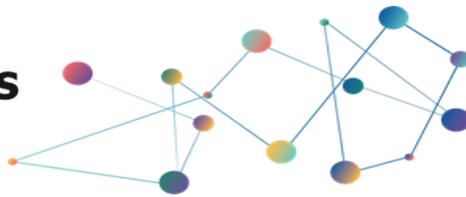
**Elena Rovenskaya**

Program Director of the Advancing Systems Analysis Program at IIASA



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Deputy Head of KSA RAS; Member of CODATA National Committee; Corresponding Member of RAS; Professor



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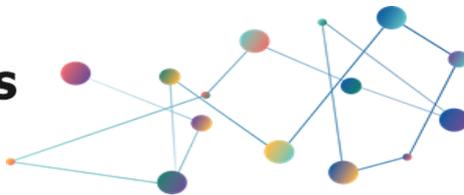
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## Poster 1

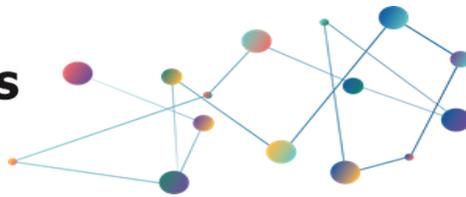
**Title:** The great victory and the formation of the historical memory of the youth of the Kyrgyz Republic

**Author:** Chernikova, Anna

**Affiliation:** Department for Research of Social and Demographic Processes in the EAEU, Institute for Demographic Research - Branch of the Federal Center of Theoretical and Applied Sociology of the Russian Academy of Sciences

### Abstract:

The article presents the results of a sociological study (qualitative comparative analysis of in-depth interviews) of the historical memory of Kyrgyz young citizens as one of the participating states of Eurasian integration, namely, their ideas about World War II and the formation of historical memory, as well as understanding and interpretation of integration processes between countries of the union. For the Soviet Union citizens, the victory in World War II was not just a socio-historical milestone. Social time is a key element in the formation of historical memory. It is interesting how the social time of historical events can be interpreted quite subjectively in a given community. Since the Victory was the most important event in the history of the Soviet Union, it can be assumed that the historical memory of the war serves as a social link of integration processes. Therefore, the study of the descendants historical memory of the victors in the Great Patriotic War becomes an interesting and scientifically urgent task. The specificity of this study was the methodology based on the use of a qualitative comparative analysis of the results of in-depth interviews of Kyrgyz young citizens. More than 400 people were interviewed using a non-random sample, no less than 50 informants from each group, selected by the snowball method. The empirical object of research is the youth of the Kyrgyz Republic, belonging to the generation of "millennials" and "postmillennials" (18 - 38 years old). The historical memory of the Great Victory is largely connected with today's ideas about the Eurasian integration of the newly independent states. Although it would seem that the content of the social memory of young people does not have a direct impact on the process of Eurasian integration, but as a potential force, it can spontaneously manifest itself in public life, or under certain conditions and the presence of an organized force, it can be included in the socio-political discourse.



## Poster 2

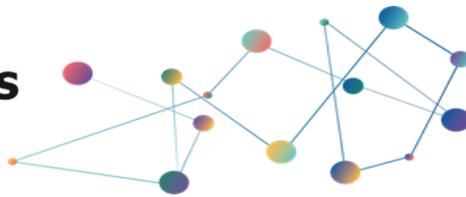
**Title:** Black carbon in Russian Arctic: main emission sources

**Author:** Ginzburg, Veronika A., Zelenova M.S., Lytov V.M., Kudryavtseva L.V., Popov N.V.

**Affiliation:** Yu.A. Izrael Institute of Global Climate and Ecology (IGCE)

### Abstract:

The problem of black carbon (BC) pollution is currently very actual, especially in the Arctic region. High pollution levels of PM<sub>2.5</sub> in air affect human health. Also, black carbon is considered as a short-lived climatic force and has a significant impact on the radiation balance of atmosphere, snow and ice albedo and surface temperature in the region. Currently, black carbon is not included in any of the existing mandatory emissions reports in Russia, therefore there are no correct estimates of emissions and analysis of sources. Quite often modelling IIASA data are used as a source of information about BC emissions from the Russian territory. The IGCE team carried out an inventory of sources of black carbon emissions in the Russian Arctic region, including emissions from such categories as stationary fuel combustion, residential use, flaring, shipping, road and off-road transportation. We also combined and compare information on BC emissions and its indirect indicators from available information sources such as EDGAR database, IEA, Rosstat, CLRTAP reports, VIIRS Suomi NPP satellite data etc. It is shown that estimates made for different sources have significant variability and often have different distributions by emission categories and different coverage of sources, which makes it difficult to compare them. According to our estimations, emissions of BC in Russia from stationary sources amounted to about 23 thousand tons and from associated gas flaring is about 24 thousand tons. The share of emissions from sources in the Arctic regions is 22% for stationary combustion and 57% for flaring because of the large accumulation of flares in the Arctic zone of the Russian Federation in the regions of active oil and gas production. The main contribution to emissions from the transport sector in the Arctic is made by maritime transport, and emissions from forest fires have the largest inter-annual variability.



## Poster 3

**Title:** The rule of non-government organizations in managing environmental risks in Yemen

**Author:** Humran, Mohammed

**Affiliation:** Sanaa University, The Union of Arab Academics

### Abstract:

Introduction :

In order to achieve its objectives, the Union of Arab Academics supports and encourages academicians, inventors, researchers and thinkers to unify practical researches topics and implement them in many areas of comprehensive development. One of these areas, For example is the garbage dump in Azraqin Region, which causes a lot of environmental problems such as the existence of serious diseases among citizens, the negative affected on soil, water, agricultural, and air. These environmental problems rise because of the of contaminants produced by garbage dump in the region.

Key Words :

The Union Of Arabian Academics, Non-government organizations, Sustainability, Environment, Economical & investment, Disposal, Researches and development, International Relations and industrial.

Project Objectives:

The objective of the environment, how to use it, manage and invest, which is the management of waste recycling for household wastes in the establishment of a small factory in the Al-Azraqi-Bani Al-Harith-Municipality of the capital in the Republic of Yemen, which aims at nappy and continuity of stay for the addressee. As well as to create jobs for young people in line with the requirements of daily life and international changes. And stems from the spirit of social responsibility in the Union in contributing to the diaper and the protection of the natural and human environment in the study area..

It is the responsibility of Union to adopt, support and invest in human and natural resources, to benefit from the experiences of partners, friendly countries in modern technology, to promote relations and to build partnerships between local, regional and international researchers, inventors and innovators..

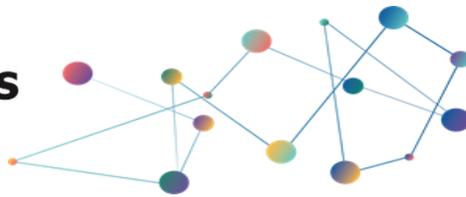
Contains:

- 1- Ideas and innovations, Hence our idea of our project through the visit and participation in the international exhibition of inventors and innovators by the President of the Union of Arab Academies, which was held in the period from 12-16 September 2018 in Foshan, during the program was visiting the waste recycling plant has been identified and the parts of the factory and meet officials and administrators in The factory and the president of the Union of Arab Academies put forward the idea of establishing a similar mini plant in Yemen as a member of the region. It means environmental problems caused by waste in the Azraq region and we found there acceptance of the idea and possibility of investment in this field.
- 2- 2- Corporations with international Organizations; The Union Of Arab Academics, Yemeni government to coordinate with the China Association of Inventors and Innovators for follow-up, preparation and coordination in the completion of the project.
- 3- 3- Economical Geography and modern industrial, The rule of the union of Arabian academics for investment, using research projects AND sharing on industrial

Results:

The establishment of a factory for the recycling of waste and the employment of young workers, where it is expected to find more than 1000 jobs in the early stages. And environmental protection in the region.

# Systems Analysis in Eurasia



## Poster 4

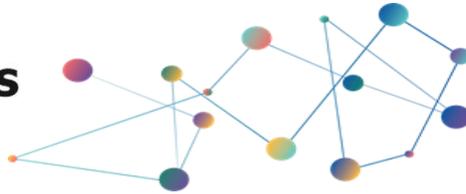
**Title:** Sustainable Alternative Futures for Urbanisation in India

**Author:** Kumar, Poornima, Natarajan, R, Ashok, K

**Affiliation:** Center for Study of Science, Technology and Policy, India

**Abstract:**

Although India is one of the world's fastest-growing economies, much of its population still lacks sufficient access to basic necessities like food, housing, and mobility. As a signatory to the 2015 Paris Agreement, India also has climate commitments to consider. India, thus, faces the unenviable challenge of balancing its developmental goals and growing consumption patterns with its climate targets. In this project, we use system dynamics modeling to explore scenarios to meet this challenge (along a 2050 time frame) through our Sustainable Alternative Futures for India (SAFARI) model. Based on the United Nation's SDGs, and India's developmental priorities, we shortlisted food, housing, and transport for all as goals to explore. SAFARI displays the feedbacks that meeting these goals have on each other, as well as on critical natural resources. In this study, we discuss select urbanisation scenarios from SAFARI, and their impacts on natural resources and energy consumption. Our focus is on the interactions between residential built form and transport, and the impact that urban form has on land, energy, and emissions. We also explore how this affects agricultural land and food security. Since SAFARI allows for user inputs and can examine the impacts of new policies and technologies, it is a useful decision-making tool for policymakers to answer 'what if?' questions.



## Poster 5

**Title:** Adaptive mobile firefighting resources: stochastic dynamic optimization of international cooperation

**Author:** Lohmander, Peter

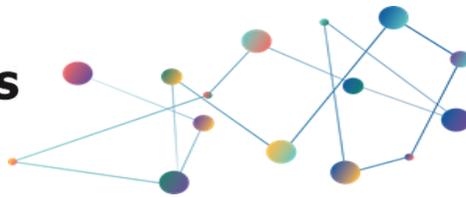
**Affiliation:** Optimal Solutions

**Abstract:**

Forest fires cause severe problems in many countries. Forest fire areas in nine European countries are investigated with respect to yearly averages, standard deviations and correlations between nations. In the region IFPS (Italy, France, Portugal and Spain), the average yearly burned area during the years 2010 to 2018 was 313.4 kha and in FGLNS (Finland, Germany, Latvia, Norway and Sweden) the corresponding area was only 7.6 kha. The correlations between the regions are strictly negative and the correlations within the regions are strictly positive.

Since forest fires usually do not occur in every country at the same time, there is a potential expected gain from international cooperation, where easily mobile firefighting resources such as water bombing airplanes are moved between nations. A general stochastic dynamic programming approach to adaptive moves of such resources is defined and suggested. General properties of the solution are derived. A particular version of the model is created and analytical derivations are performed. It is demonstrated that the expected objective function value, the expected present value of total costs, is a strictly increasing function of the fire correlation between nations. Adaptive moves of mobile resources between the regions IFPS and FGLNS have the advantage of negative correlations between these regions. Some adaptive moves can also be motivated within the regions even with positive correlations, thanks to the low costs of short moves.

# Systems Analysis in Eurasia



## Poster 6

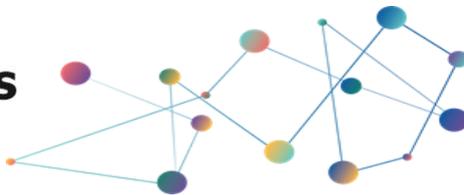
**Title:** Forest fire expansion under global warming conditions: multivariate estimation, function properties and predictions for 29 countries

**Author:** Lohmander, Peter

**Affiliation:** Optimal Solutions

### Abstract:

This study investigates the average relative burned area, as a function of different conditions, in 29 countries. Detailed international statistics of forest fires, published by FAO and European Commission, are used as empirical data. A multivariate fire area function with empirically very convincing statistical properties is defined, tested, and estimated. A set of hypotheses was created based on three fundamental factors. The hypotheses could not be rejected on statistical grounds, and the estimated parameters obtained the expected signs with very low P-values. The residual analysis supports the selected functional form. Future fire areas are predicted for 29 countries, conditional on three alternative levels of global warming conditions. The estimated fire area function can explain the forest fire areas in different countries via three fundamental factors that are 1) The average area of forest fires divided by the total forest area is an increasing function of the average temperature. Hence, global warming is expected to make future forest fire problems even more severe, 2) The average forest fire area divided by the total forest area is an increasing function of the total forest area, and finally 3) The average area of forest fires divided by the total forest area is a decreasing function of the population's size.



## Poster 7

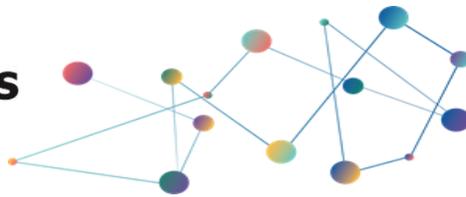
**Title:** Selection of a climatic model for forecasting the surface air temperature in the continental part of the Arctic Region (Arkhangelsk Region, Komi Republic, Nenets Autonomous District)

**Author:** Maksimova, Olga, Ginzburg, V,

**Affiliation:** Yu.A. Izrael Institute of Global Climate and Ecology; MISiS

### Abstract:

The aim of this work is to develop approaches to assessing the reproducibility of regional characteristics of surface air temperature in the Arctic region of Russia using global climate models participating in the CMIP5 mutual comparison project. The comparison was made with the reanalysis of the ERA5 model in the period from 1979 to 2005 in the continental part of the Arctic region, represented by the Arkhangelsk region, the Komi Republic and the Nenets Autonomous district. Three comparison approaches are proposed, which include analysis of both dynamic indicators and analysis of indicators calculated over the entire data set. The breakdown proposed by the authors allows us to prioritize the importance of indicators when choosing the most accurate forecast model, depending on the further task of the study. The disadvantages and advantages of each approach are identified. The developed approaches are used to compare models for the considered part of the Arctic region. Based on the results obtained, a selection of global climate models was made that best reflect the climatic characteristics of the surface temperature for the analyzed period and, accordingly, can be used to analyze the predicted changes in this region. It is proved that the HadGEM2-ES and IPSL-CM5A-MR models have the most accurate forecast qualities for the continental part of the Arctic region in all characteristics, and the CMCC.CMS and BNU-ESM model have the least accurate. A group of models has been formed that gives high forecast properties for the winter and summer seasons for the selected region. It is shown that for the winter season the priorities for choosing the most accurate model change towards NorESM1-M. According to the proposed scheme, the global climate model INMCM4 is compared with the reanalysis model ERA5. The model shows the highest accuracy for long-term average monthly temperatures in June, but in general, for the entire data set, it underestimates the average annual temperature and the scatter from ERA5 data by almost 2.5 °C. The general trend of the INMCM4 model based on moving averages of multi-year monthly averages from 1979 to 2005. gives an underestimate relative to ERA5, and thus has low predictive properties.



## Poster 8

**Title:** Sustainability Assessment of Biofuel Supply Chain in Transport Sector using Circular Economy Framework

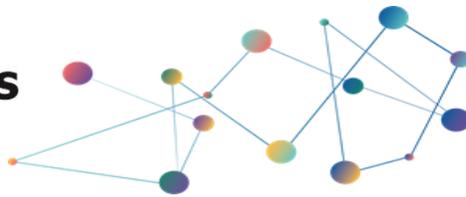
**Author:** Mohanty, Reema, Balachandra, P, Dasappa, S

**Affiliation:** Indian Institute of Science, Bangalore

### Abstract:

Global concerns about the emission of fossil fuel in the transport sector are growing day by day. According to the IEA report, the transport sector contributes almost 25% of global CO<sub>2</sub> emissions, which is 71% higher than in 1990. Approximately 74% of transport emissions are caused by road transportation. Biofuel is one of the clean energies among the various forms of renewable energies like Solar, Wind, Geothermal, Tidal, etc. It reduces greenhouse gases, lowers particulate matter by reducing smog and making our air healthier to breathe, and reduces hydrocarbon emissions. In the proposed research sustainability assessment of 2nd generation biomass to ethanol supply chain is emphasized. The focus has spanned from linear economy to a cradle-to-cradle or circular economy-based approach. It includes a (2G) ethanol production system that uses biomass sourced from surplus agro-waste and the ethanol produced is utilized in the transport sector by including stages of transformation – (i) Agriculture, (ii) Biomass logistics, (iii) Biofuel production, and (iv) Biofuel utilization. Both the inputs and outputs of every stage of transformation are captured with the help of mass balance. Sustainability assessment of the supply chain with respect to economic indicators is done by the virtue of particle swarm optimization technique. In the first block or harvesting area, it was observed that there is a positive correlation between Surplus Biomass and profit. The payback period is nearly equal to 3 years. Social and Environmental sustainability is assessed by the systems thinking approach. An ecoinvent model is used to assess the environment and social sustainability. The result shows that the particulate matter emission is low in the harvesting area in comparison to acetaldehyde and nitrous oxide emission. The model is validated using data obtained from the feasibility study of a proposed 2nd generation bioethanol plant in India.

# Systems Analysis in Eurasia



## Poster 9

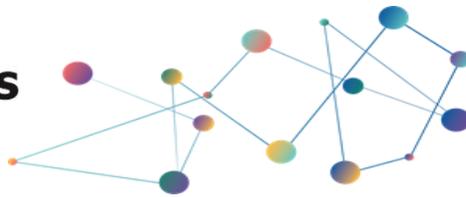
**Title:** Sustainability of the urban and rural regions development in Central Asia

**Author:** Sagin, Janay, Urazaliyev R.

**Affiliation:** Association for the Conservation of Biodiversity of Kazakhstan, Nazarbayev University

**Abstract:**

The concept of the sustainable water usage, sustainable drainage system is poorly developed and implemented in Central Asia. Some of the main issues are related to the inefficient integrated surface groundwater managed and lack of the proper transboundary water resource coordination works, which resulted on exsiccation of the Aral Lake. Increasing urbanization, resulted on exsiccation of the wetlands, small lakes with expansion of the unsustainable cities, as Astana (Nur-sultan), which eliminates birds, wetland habitants, creates many questions. How sustainable cities should be developed? How we can keep the wetlands and keep productive natural soils, to mitigate desertification in Central Asia? How the rural regions should be developed? Why many rural regions are abounded and people move to the urban regions, cities are getting crowded? Will it possible to set up the proper Sustainable Drainage Systems (SuDS) in Central Asia? The SuDS approaches to manage surface water that take account of water quantity (flooding), water quality (pollution) biodiversity (wildlife and plants) and amenity are getting popular worldwide, but unfortunately SUDS is missing in Central Asia. How and what policy, what should we do for the expansion of SuDS in Central Asia? We are trying to find answers on these questions and our presentation will be related to the SuDS adaption for Central Asian region.



## Poster 10

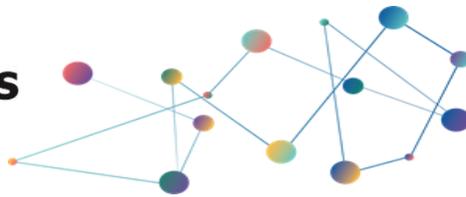
**Title:** A Systemic Analysis of the Environmental Impacts of Gold Mining within the Blyde River Catchment, a Strategic Water Area of South Africa

**Author:** Selebalo, Itumeleng, Scholes, M.C. and Jai K Clifford-Holmes

**Affiliation:** University of the Witwatersrand

### **Abstract:**

Exploratory modelling of the impact of gold mining on groundwater in a strategic water area of South Africa was undertaken. A systems dynamics (SD) model was developed to simulate the impact of gold mining on water quality, focusing on groundwater contamination risk, within the context of competing developmental priorities around water resource development and the socio-economic gains from gold mining. The model also identified interventions to minimise the impacts by the year 2040. The study area was the Blyde River Catchment (BRC), which is part of the Olifants Water Management Area in South Africa. This area is an important contributor, currently and in the future, to freshwater flows and groundwater in the Olifants River Catchment (ORC), which is one of South Africa's most economically important catchments. The model development process included a causal loop diagram--based problem conceptualisation, a drawing of stock-flow diagrams and the determining of model parameters based on a combination of background literature, data from environmental impact assessments and the national Department of Water and Sanitation. The model showed the potential environmental risks of gold mine wastewater production and interventions to minimise these risks. The most effective intervention identified to reduce the risk of groundwater contamination was the development and use of synthetic-lined tailings dams. The baseline simulation result of sulphate loading of 5430 t/year can be reduced by 3070 t/year to give a simulated sulphate load of 2270 t/year in 2040 using this intervention. In comparison, the simulated wastewater recycling intervention only reduced the sulphate load to 4630 t/year and the wastewater treatment interventions to 3420 t/year. This project contributes to the exploratory modelling of an understudied region of the BRC that is a crucial provider of freshwater flows to the ORC, which is threatened by increasing gold mining. The SD model highlighted the importance of protecting the dolomitic aquifers in the BRC for the long term sustainability of the catchment, which is particularly important if groundwater development occurs.



## Poster 11

**Title:** Analyzing the entrepreneurial ecosystem using an integrative systems-based framework in Philippine social enterprises

**Author:** **Tiongco, Monique Ann A.**, Gotangco Gonzales, Charlotte Kendra, Cuyegkeng, Maria Assunta C.

**Affiliation:** Ateneo de Manila University

### **Abstract:**

Social enterprises operate in an entrepreneurial ecosystem, which is complex and non-linear in nature. This ecosystem is a combination of not just the actors but of social, political, economic, and cultural elements that form part of the risks of starting, funding, and supporting development and growth of social entrepreneurship as ecosystems are already embedded in the national culture, legal and institutional environment. By not focusing on the complex interactions among actors, organizations and socio-cultural forces, work on entrepreneurial ecosystem is being limited to just the presence of components. This study attempts to examine the emerging issue on interdependencies, which help create and reproduce the overall ecosystem. The models provide a novel way in examining the links through the feedback guided analysis, particularly by using the cultural adaptation template developed by Newell and Proust. This approach investigates the linkages between and among social, cultural, environmental and economic forces. It thus complements the entrepreneurial ecosystem by revealing key interdependencies and how one variable affects others. This is done through documenting the experiences of Philippine social enterprises to understand the feedback structures that occur in their daily environment. It presents how a systems-based framework can guide social enterprises in transforming weaknesses to strengths and threat to opportunities as well as in addressing social problems and gaining perspective on how they relate to each other. By doing so, it aids in determining and addressing management issues and its root causes as well as the nonobvious interrelationships that shape the system performance over time, as displayed on the effect of marketing strategies and the profit-passion tradeoff.