

Report activity A9. Gap analysis of the current available national guidelines in relation of the project topic

In Romania climate change is a phenomena which causes more and more extreme events like flooding in urban areas. The Ministry of Environment and Climate Change is the superior authority that is responsible with issuing the management actions plans and guidelines for climate change adaptation. Despite all its efforts until now there is no specific guideline for climate change in urban areas. In march 2013 a documenting analysis for environmental and climate change sectors was conducted through Regional Development European Funds program which brings into the light few ideas regarding the effect of climate change upon the environment and economic sector. This analysis also promotes the idea of adaptation to climate change as a mechanism for risk prevention and management. The guideline referring to Adaptation to Climate Change was approved in 2008 (under no 1170) by Ministry Order and contains recommendations for 13 key sectors like: agriculture, biodiversity, water resources, forests, infrastructure, urban planning and construction, transport, tourism, energy, industry, health, recreational activities and assurance.

According to statistics, the global urban population has doubled in the last 50 years and is expected in 2030 that two-thirds of the world population will live in cities. Increasing the density population, development, cost dynamics, lifestyle, specific infrastructure, ethnic diversity and culture are elements that may be vulnerable to climate change. Because of the particularity of "confinement" the urban temperatures in these areas will be higher than in the countryside. The main impact of climate change on urban areas, infrastructure and buildings is related mainly to the effects of extreme weather events such as heat waves, snow storms, floods, increased instability of slopes and modification of geophysical properties. Thus urban planning and design of appropriate infrastructure plays an important role in minimizing the impact of climate change and reducing environmental and anthropogenic risk.

The possible threats are : increased risk of landslides, altering the characteristics of building materials and building foundations (ex. setting time of concrete moisture sensitive land), building damage due to the increased intensity of storms, landslides and coastal erosion, settlements and infrastructure affected by increasing the frequency of floods, lowering the comfort of the population, loss stability in uneven areas with buildings on sensitive land humidity or in floodplains, increase the level of comfort in buildings due to high costs of thermal insulation materials and solutions.

The opportunities could be enumerated further: new markets for technical, construction materials and resistant to the effects of climate changes.

Recommendations and adaptation measures: approach to planning and urban space management practices need to be addressed in the long term taking into account the potential impact of climate change.

Among the important measures to be taken, there are: promote prevention and early intervention systems effectively in the event extreme weather events, resizing sewer system to take over excess water sprayer derived from intense rains in the city, development of adequate pavements that ensure rainwater infiltration in the sidewalks, pedestrian platforms, parking and storage, minimizing the risk of periods of excessive heat caused by increasing surface green spaces and water green spaces, proper development of green building standards that provide storage and circulation of rainwater, water savings through efficient installation and development of green spaces in the terraces, standards development and constructive solutions to improve performance, thermal insulation of buildings, in order to improve energy consumption, implementation of modern architectural concepts for construction of buildings with potential maximum use of renewable energy sources, promotion of appropriate materials

and constructive solutions potential effects of climate changes, extension of technologies and practices to use renewable energy sources utilities necessary, promoting training programs and public awareness needed to apply adaptation measures identified and training programs for architects on buildings to ensure resilience to climate change [*Guide regarding the adaptation to the effects of the climate change, MECC, 2008*].

The expected global climate changes will result in an increase in temperature and average sea level. Locally around The World there are both predicted increase and decrease in rainfall, and it is difficult to generalize the impacts from climate changes. Hence, it is recommended e.g. to use statistical downscaling to find new design rainfall, etc. (*DHI, 2012*).

In the frame of the “Techniques and methods for climate change adaptation” project one main activity is to identify the gaps in relation to climate changes and urban areas which mainly the municipalities and the water operators in the city face in their daily activity. It is known and confirmed by the institutions mentioned before there exist events of heavy rainfall, extreme temperatures and weather conditions in general that raise difficulties in operation of the urban networks and treatment plants or cause urban flooding. These extreme weather conditions appear mainly due to climate change and cannot be prevented, as nature cannot be controlled. The best approach in such cases is to learn to adapt and live with extreme events. In order to do so there are several steps which are considered useful in leading to a general adaptation:

- Gap analysis of the municipalities and water operators in coping with these more frequent extreme events
- Identifications of necessary tools that could be used to find solutions for adaptation to climate change
- Guideline for how to put into practice of the tools identified in previous steps

In order to fulfill first step the Romanian partners UTCB and Apanova Bucuresti created 3 questionnaires in two different phases. The survey of the first phase was to identify if the respondents are familiar with climate change concept, to describe their water utility networks and to find out if there are any hydroinformatic tools implemented used to exploit the water supply and collection systems. The first questionnaire reflected this purpose through 11 questions. In order to address it to a broad area of users on 11.07.2014 a thematic workshop was organized in Bucharest where representatives of municipalities, water operators and relevant institutions from water board administration participated to several presentation regarding climate change and its effect on urban areas, presentation of hydroinformatic tools that could be used for climate change adaptation and filled up this questionnaire (can be found below) for identification of the gaps in relation with climate change and urban network operation.

QUESTIONNAIRE

Regarding adaptation to climate change in urban areas

1. What type of collection system exists in your city:
 - a. Separate (one collection system for pluvial waters and another one for waste water)
 - b. Joint (both pluvial and waste water collection system in one network)

2. Where there any floods due to pressurized pluvial collection system in your city?

Yes/No

3. Do you have hydraulic models already created for the collection and water distribution systems?

For water distribution		For joint collection system		For rain collection system	
Yes		Yes		Yes	
No		No		No	

4. In case you have to develop a model for the collection system , it contains:

a) the whole collection network

b) pipes with $h \geq 30$ cm

c) pipes with $h \geq 50$ cm

d) pipes with $h \geq 100$ cm

5. Did you consider a hydraulic model in your company? If yes, for what purpose do you wish to use it for?

6. In case you already have a collection system model already developed
 c. Are you satisfied with the status of the model (e.g.: do you need to update the model?)

Yes/No

d. Are you satisfied with the way the model is used?

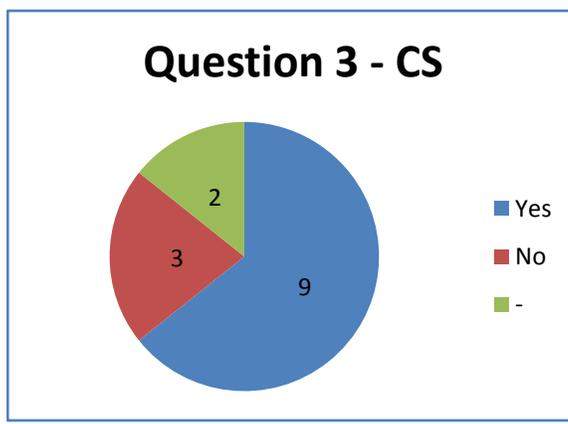
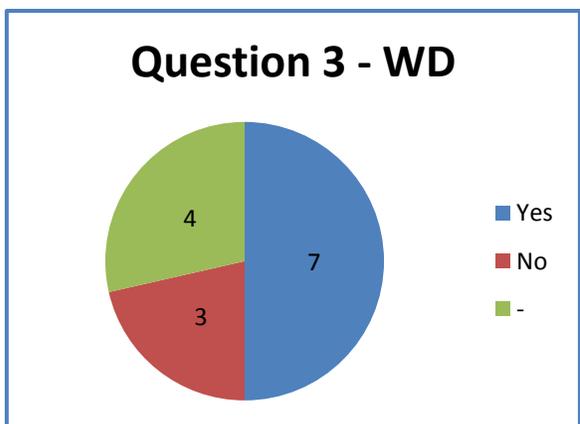
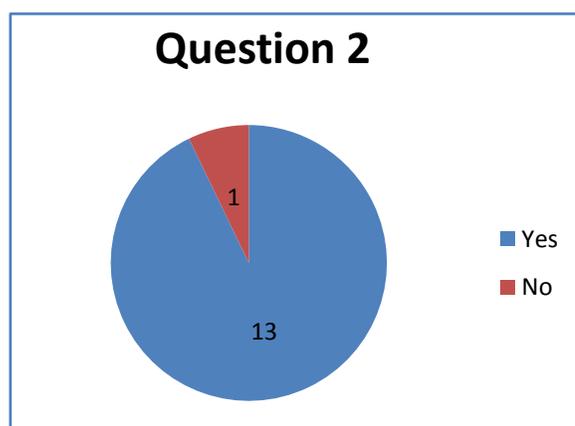
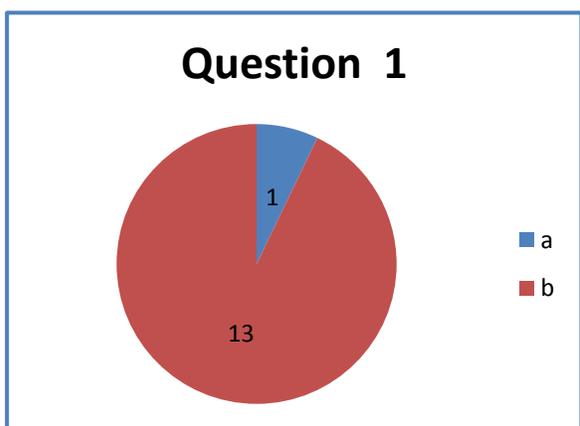
e. Yes/No

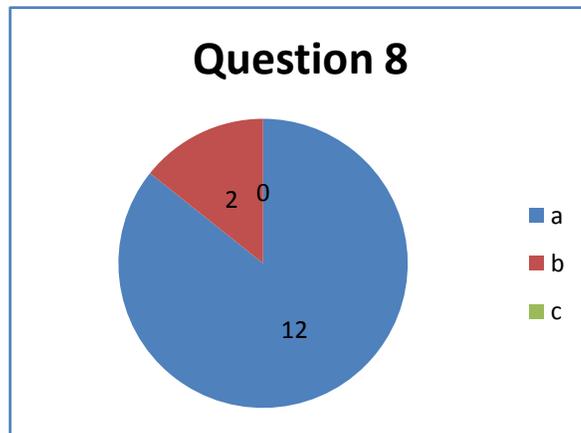
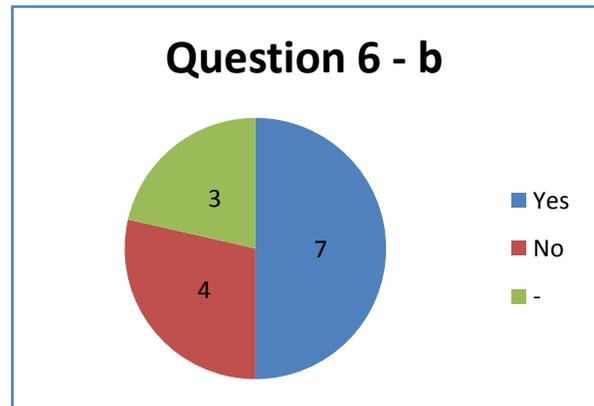
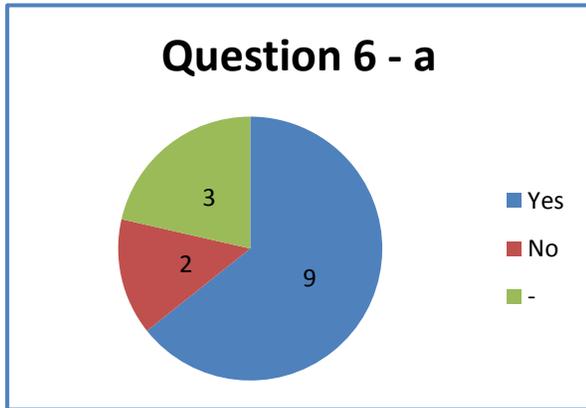
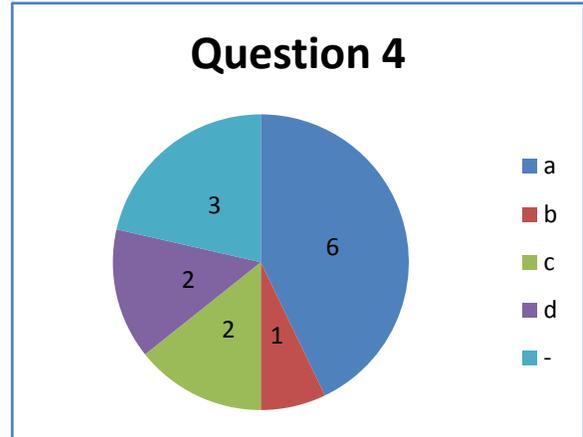
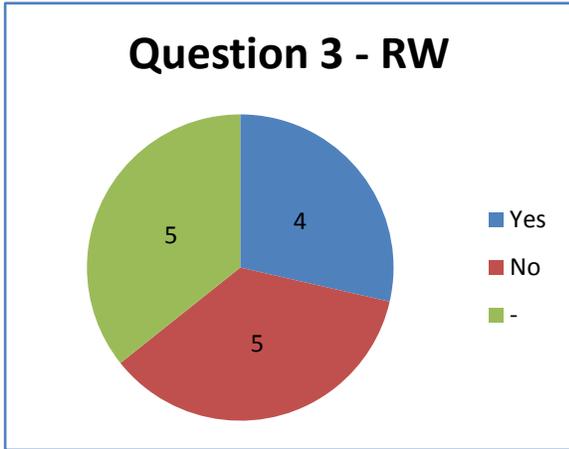
7. In what format are the data referring to the collection and water distribution systems (e.g.: paper, digital, GIS etc.)

8. Are you interested to participate at a free training for 1-2 days with the theme „Techniques and methods for adaptation to climate change in urban areas”?

- a. Yes, I want to participate
- b. I am interested to participate but I need more details
- c. I am not interested

In total for this workshop we received **14** filled questionnaires which were analyzed and processed. A statistics of the answers was created in order to identify the most common type of water utility systems and the general knowledge and interest in the climate change subject.





The survey put into the evidence that most of the urban networks are joint systems and the collection systems were put under pressure due to heavy rainfall, fact which generated urban floods. Another important result of the survey is the existence of hydraulic models for water distribution (approx. 50%), joint systems (75%) and rain collection systems (30%) which represents an advantage in easier identification of the solutions for climate change adaptation. Most of the respondents agreed that the hydraulic models should be extended for the whole network system and there could be also improvements in the way the models are used for daily activity of the operators. In the end the majority of respondents expressed their interest in participation at a free training for 1-2 days with the theme „Techniques and methods for adaptation to climate change in urban areas. There were additional suggestions to enlarge the questionnaire with additional questions related to climate change for potential respondents that were not present to this workshop. After taking into consideration all received observations the first questionnaire was completed with 3 additional questions that can be found below:

9. Do you think that climate change may affect urban areas?

Yes

No

10.If you answered yes to the previous question, please indicate which is the way of your perspective through which climate change may affect urban areas (e.g. can produce urban flooding?)

.....

11.Know the existence of a local / regional / national to adapt to climate change conditions for your city?

Yes

No

This questionnaire is now available online on the project site and can be accessed by any stakeholder interested to fulfill the survey. Although the activity A9 Gap analyzes of the current available national guidelines in relation of the project topic from WP 3 was finalized according to the Gantt table the survey remains open in order to collect as many feedback as possible during the execution time of the project.

The next step in creating the gap analysis was to map the up-today availability of guidelines useful for city managers (national level) and the needs for city administration, authorities and utilities` staff for coping with the identified gaps. All the identified needs would serve for structuring a training material which will be used in vocational training sessions for local administration and utility companies` staff. In this second phase the survey method was applied differently for utility companies and local authorities (mainly city halls) using two questionnaires:

QUESTIONNAIRE for Local Administration (City Halls)
Regarding adaptation to climate change in urban areas

1. Do you consider that climate change may affect urban areas?
 - a. Yes
 - b. No

2. Do you know of the existence of a local / regional / national plan to adapt to climate change conditions for your city?
 - a. Yes
 - b. No

3. What problems due to sewage networks do you face in your city?
.....

4. Are you interested to participate in a free course on "Techniques for adaptation to climate change in urban areas"?
 - a. Yes, I want to participate
 - b. I am interested to participate but I need more information
 - c. Not interested

5. What length of the course do you consider is recommended for your staff?
 - a. 1 day
 - b. 2 days
 - c. 3 days

6. What category of personnel do you consider it would be helpful to participate in such a training?
 - a. Technical (GIS department)
 - b. Manager
 - c. Economic

7. Choose from the list below the training topics you are interested in:
- Urban Flood
 - Solutions to minimize the effects of heavy rainfall due to climate change in urban environment
 - IT tools for urban flood management
 - Other topics (please specify)

QUESTIONNAIRE for Local Administration (Utility Companies)
Regarding adaptation to climate change in urban areas

- Do you think that climate change may affect urban areas?
 - Yes
 - No
- Do you know of the existence of a local / regional / national plan to adapt to climate change conditions for your city?
 - Yes
 - No

3. Do you have hydraulic models for the sewerage networks?

For mixed collection system		For pluvial collection system	
Yes		Yes	
No		No	

4. Are you interested to participate in a free course on "Techniques for adaptation to climate change in urban areas"?

- Yes, I want to participate
- I am interested to participate but I need more information
- Not interested

5. What length of the course do you consider is recommended for your staff?

- a. 1 day
- b. 2 days
- c. 3 days

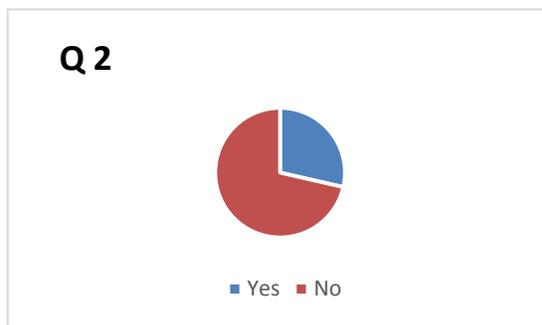
6. What category of personnel do you consider it would be helpful to participate in such a training?

- a. Technical (GIS department)
- b. Manager
- c. Economic

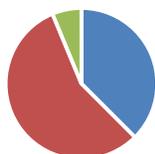
7. Choose from the list below the training topics you are interested in:

- a. Application of GIS data for sewers
- b. Sewerage network modeling using Mike Urban
- c. Modeling of overland flooding as a result of putting under pressure the collection system due to heavy rainfall
- d. Creating reports with model results
- e. Other topics (please specify)

The questionnaire was sent by email and post to potential stakeholders in local administration institutions and to utility companies. After the 2 weeks survey period **14** filled questionnaires from the local administration and **19** filled questionnaires from the utility companies were received and analyzed. Further the statistics of the answers received from the local administration can be seen:

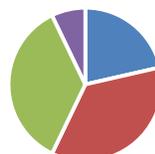


Q 4



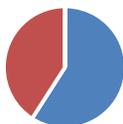
■ Yes ■ Yes, but I need more information ■ No

Q 5



■ 1 day ■ 2 days ■ 3 days ■ -

Q 6



■ Technic ■ Manager ■ Economic

Q 7



■ a ■ b ■ c

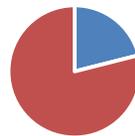
The answers from the utility companies were also analyzed and a statistics was created also :

Q 1



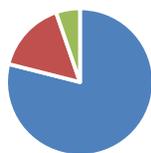
■ Yes ■ No

Q 2



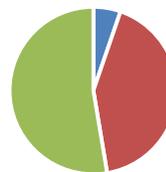
■ Yes ■ No

Q 3 - mixed collection system

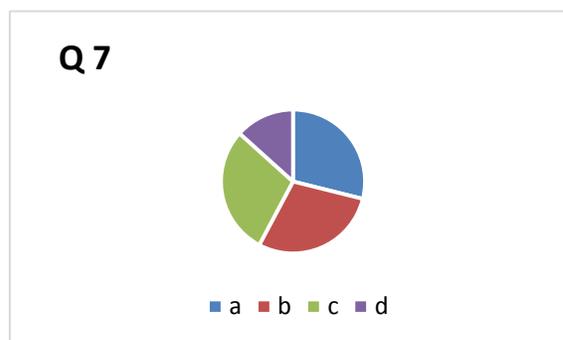
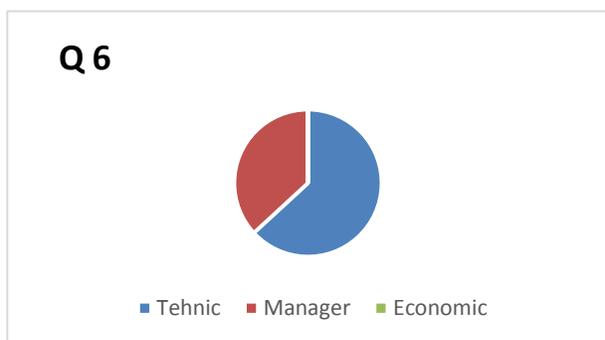
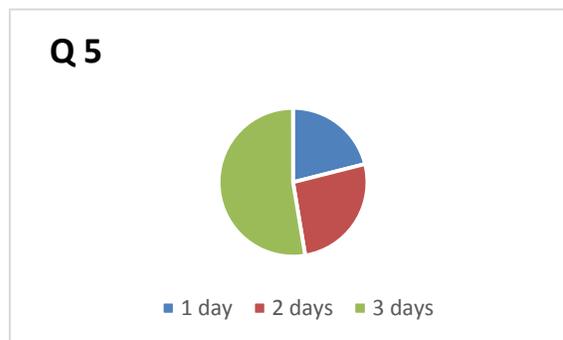
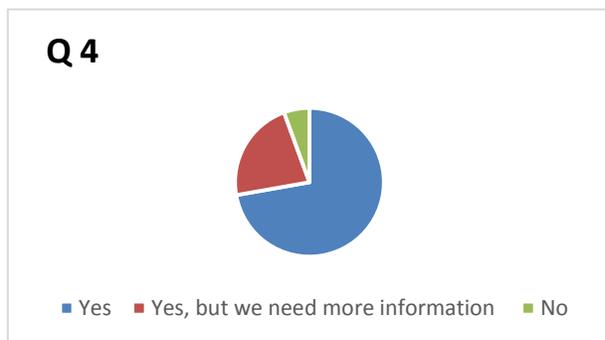


■ Yes ■ No ■ -

Q 3 - rain collection system



■ Yes ■ No ■ -



As main conclusions of the survey for both type of institutions all respondents considered that urban floods are one of the main important subject to be addressed in the frame of the vocational training we shall organize for the stakeholders in order to cope with the gaps they are confronted with at present. The majority of the respondents agree that this floods could be generated by the climate change which can affect the urban areas and doesn't know of the existence of a plan for climate change adaptation in urban areas. For the local administration 56% of the respondents declared their interest in participating at a training on the given topic, while 38% showed their interest with the reserve to find out more details about it. The percentages for the respondents from the utility companies are very much alike (72% will participate and 22% will participate if they have more detailed information). For the local administration the training should last preferably 1 (22%) or 2 / 3 days (36% vs 36%) while for the utility companies the majority prefers 3 days (53%) and should be attended mostly by technical persons (63% for utility companies and 59% for local administration) and managers (37% for utility companies and 41% for local administration). As when it comes to the topic all proposed options are of great interest to all participants of the survey. These information were further used in establishing the categories of the trainees and the length of the vocational training sessions as well as for the development of the training documentation material. Thus 3 categories of trainees will be addressed during the vocational training sessions:

- a. Teachers, students and postgraduates
- b. Local administration authorities' staff
- c. Utility companies' staff

In total a minimum of 60 persons will be trained assuring the transfer of knowledge for the adaptation tools for climate change in urban areas.

The topics addressed for the 3 categories cover but is not limited to the following issues:

a. Training for teachers, students and postgraduates – 2 days

- Introduction to the 3C project for Cities
- Application of GIS data for sewers
- Sewage network modeling using Mike Urban - presentation
- Modeling land surface flooding as a result of putting pressure sewage pipes to heavy rainfall - Mike 21 - presentation
- Building a model of sewage (the study area)
- Running simulation, viewing of the results
- Climate change in urban areas
- Modelling the effect of climate change on sewer network
- Coupling sewer model with a model of land surface water flow
- Running, viewing results, conclusions
- Q & A, completing assessment questionnaire

b. Local administration authorities' staff

- Introduction to the 3C project for Cities
- Urban Floods
- Solutions to minimize the effects of heavy rainfall due to climate change in urban areas
- IT tools for urban flood management
- Blue Green Concept
- Q & A, completing assessment questionnaire

c. Utility companies' staff

- Introduction to the 3C project for Cities
- Application of GIS data for sewers
- Processing of rainfall recorded IDF curves
- Sewage network modeling using Mike Urban - presentation
- Modeling land surface flooding as a result of putting under pressure of the sewage pipes due to heavy rainfall - Mike 21 - presentation
- Building a sewer network model (the study area)
- Running simulation, viewing of the results
- Climate change in urban
- Modelling the effect of climate change on sewer network
- Coupling sewer model with a model of land surface water flow
- Running simulation, viewing results, conclusions
- Q & A, completing assessment questionnaire

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