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# KAZAKHSTAN STAKEHOLDER CONSULTATIONS – WORKSHOP REPORT

FEBRUARY – MARCH 2013



**April 2013**

This publication is made possible by the support of the American people through the United States Agency for International Development (USAID). It was prepared by Engility Corporation.

This report has been prepared for the United States Agency for International Development (USAID), under the Climate Change Resilient Development Task Order No. AID-OAA-TO-11-00040, under The Integrated Water and Coastal Resources Management Indefinite Quantity Contract (WATER IQC II) Contract No. AID-EPP-I-00-04-00024.

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Cover Photo: Daniel A. Byers, Skyship Films

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# TABLE OF CONTENTS

<b>I.</b>	<b>INTRODUCTION</b> .....	<b>1</b>
	Background for stakeholder workshops.....	1
	Description of stakeholder workshops.....	1
	Profile on participants.....	2
<b>II.</b>	<b>SMALL GROUP EXERCISES</b> .....	<b>3</b>
	Exercise: Top Problems Facing the Wheat Sector .....	3
	Exercise: Decision making at the farm level.....	4
	Exercise: Perception of climate change and potential impacts on the wheat sector .....	6
	Exercise: Assessing vulnerability to climate change and variability .....	7
	Exercise: Options for addressing vulnerability .....	8
	Plenary discussion of food security in Central Asia and Kazakhstan’s role in meeting demand for wheat.....	10
	Adaptation Game.....	10
	Workshop Conclusions and Next Steps .....	11
	<b>ANNEX A: AGENDAS</b> .....	<b>13</b>
	<b>ANNEX B: PARTICIPANT LISTS</b> .....	<b>17</b>
	<b>ANNEX C: INSTRUCTIONS</b> .....	<b>25</b>
	<b>ANNEX D: PRESENTATIONS</b> .....	<b>40</b>



# I. INTRODUCTION

## **BACKGROUND FOR STAKEHOLDER WORKSHOPS**

From November 26 – December 7, 2012, Dr. Glen Anderson, Chief of Party for USAID’s Climate Change Resilient Development (CCRD) Project, conducted a TDY mission in Astana, Kazakhstan. The purpose of this mission was to participate in project start-up activities for the USAID Integration Pilot awarded to United Nations Development Programme (UNDP) titled “Improving the Climate Resiliency of Kazakhstan Wheat and Central Asian Food Security” (CRW). As a result of this TDY, CCRD was engaged to support CRW on several activities including Activity 2.1 “Needs assessment and stakeholder consultations.”

## **DESCRIPTION OF STAKEHOLDER WORKSHOPS**

CCRD proposed conducting four one-day stakeholder workshops, to facilitate discussions with stakeholders on the challenges facing the wheat sector in Kazakhstan, with primary focus on the impacts of climate change and variability: one stakeholder meeting in Astana with major government and private sector groups; and three stakeholder meetings with farmers and local officials in the northern wheat growing regions. These workshops were a collaborative effort between the UNDP-funded CRW Project Team and the USAID-funded and Washington, DC based CCRD Project, with support from the Ministry of Agriculture and KazAgroInnovation.

In advance of the four stakeholder meetings, CCRD provided training for five facilitators, recruited by CRW from CRW Project staff, in conducting small group exercises. The training of trainers was held on Thursday, February 21, 2013, and the four stakeholder consultations were carried out over a two-week period, from February 22 to March 1.

The first workshop was held in Astana on Friday, February 22. This consultation was attended by 19 participants, and brought together national-level policymakers and other stakeholders that support the wheat sector. Participants discussed general challenges facing the wheat sector, climate impacts, vulnerability, and options for addressing climate impacts, food security in Central Asia, and Kazakhstan’s role as a wheat exporter. This consultation utilized a combination of presentations, small group discussions, and plenary discussions. CCRD staff made the technical presentations and the UNDP facilitators guided the small group discussions on four topics: 1) general challenges in the agricultural sector (primarily for context); 2) perceptions of climate change and variability in the wheat sector; 3) vulnerability of the sector to climate change and variability; and 4) brainstorming on a range of adaptation options to address climate variability.

The subsequent three one-day regional stakeholder meetings in the northern wheat growing regions were held in three different oblasts (regions): Kostanay (in the city of Kostanay), Akmola (in the village of Shortandy), and Northern Kazakhstan (in the city of Petropavlovsk). These regional workshops brought together farmers and local authorities to discuss the general challenges facing wheat growers and the impacts of climate change and variability on farm-level decision-making. The first regional stakeholder meeting was held in the city of Kostanay on February 25, at the Kazakh Research Institute of Agriculture, with 26 participants in attendance. The second regional stakeholder meeting was convened in the city of Shortandy on February 27, at the A. Barayev Kazakh Research Institute (“Grain Institute”) with 24 participants in attendance. The third and final regional stakeholder meeting was held at the Hotel Skif in Petropavlovsk on March 1, 2013, with 24 participants in attendance. These meetings included

technical presentations and small group and plenary discussions. The agenda for these meetings included small group discussions on decision-making and the use of climate information.

This summary report has been prepared to cover the four consultations. Attached to these reports are the workshop agendas and participant lists.

## **PROFILE ON PARTICIPANTS**

Astana workshop: This consultation was attended by 19 participants, and brought together national-level policymakers and other stakeholders that support the wheat sector. In attendance were various officials from KazAgroInnovation (Kazakhstan's national research institutes and agriculture extension service), the Ministry of Agriculture, the Ministry of Environmental Protection, the National Space Agency, KazHydromet (Kazakhstan's met service), KazAgroMarketing, ProdContract Corporation, KazAgroFinance, and the national Farmers Union, and the national technical and agricultural university.

Regional workshops: The three regional workshops were attended by 24-26 participants. These workshops were originally intended for farmers. However, in actuality, these workshops were attended by a mix of farmers, agronomists, agricultural researchers and academics, meteorologists, and representatives from the private sector. The composition of workshop participants was influenced by various factors, including inclement weather, as snow storms made it difficult for many farmers to attend the regional workshops due to road conditions. Cultural expectations also came into play, as UNDP felt obligated to invite local authorities to the workshops, as they were considered high level due to the presence of visiting foreign experts. Additionally, because the workshops were hosted by and convened at research institutes, local staff from these institutes participated. Students participated in the Petropavlovsk meeting but were counted as observers rather than participants in the participant lists.

## II. SMALL GROUP EXERCISES

### **EXERCISE: TOP PROBLEMS FACING THE WHEAT SECTOR**

This exercise was conducted in each of the three regional workshops, as well as the workshop in Astana. The objective of the exercise was to identify the top 5 problems facing wheat producers in Northern Kazakhstan by engaging in small group discussions. Understanding the top problems/challenges facing wheat producers in Northern Kazakhstan will help to: 1) set context for the workshop and 2) identify problems that may be exacerbated by future climate change in subsequent exercises; and 3) help CRW understand non-climate stressors that might need to be considered in developing recommendations for a climate-resilient wheat sector.

As part of this exercise, participants first engaged in small group discussions on the top challenges. In Astana, participants were then asked to write their top five problems on post-it cards and rank them by placing them according to importance on five flipchart sheets labeled #1 through #5. In the regional workshops, participants brainstormed activities on a flip chart and then ranked by importance as a group.

The CRW Project team then led a plenary discussion of the priority challenges as reported by the small groups. Participants were encouraged to contribute to the discussion by responding to other team's report outs.

**FINDINGS:** The results from this exercise are presented as a synthesis of the top problems identified in the Astana and regional workshops.

***Farm equipment and agricultural chemicals*** – In all workshops, participants identified depreciated and inferior equipment and machinery as a key constraint on increasing productivity and applying improved cultivation technologies such as no-till and minimum-till practices. Locally manufactured machinery is of poor quality and equipment from Europe, North America, and Asia is subject to high customs duties on top of the high transportation costs and premium paid for superior equipment. Similarly, the highest quality herbicides and pesticides, sourced from international suppliers, are significantly more expensive than local chemicals. While the government provides subsidies for chemicals, they are less for international chemicals than for the poorer quality local chemicals.

***Availability of high quality seed varieties*** – Although the research institutes maintain a large seed bank, the seed available on the market is generally of low quality. It was noted that Kazakhstan does not currently have an industrial producer of seeds and farmers plant the seeds they can source from the institutes. It should be noted that this limits the farmers' capacity to diversify crops, shift to more drought-resistant wheat varieties or alternatives such as oilseeds (when drought is forecast), or to take advantage of favorable weather forecasts by planting higher valued crops.

***Lack of skilled farmers and agricultural specialists*** – This issue relates to both the production sector (need for skilled farm workers, agronomists) and the availability of training and advising services provided by agricultural extension agents. KazAgroInnovation's extension services have been developed over the last decade but the poor quality of roads, limited number of extension agents, and the large area to be covered by agents, limits the potential for face-to-face support.

**Poor climate information** – There is a lack reliable/precise forecasts and information related to season weather forecasts and agro-meteorological conditions during pre-seeding period, and lagging provision of meteorological data. Farmers mistrust the information provided by the met service and rely on traditional knowledge, superstition, and guess-work upon which to base planting decisions (it should be noted that we heard that planting dates are announced in each region)

**Wheat sector economics** – It was noted by one farmer that wheat farmers lose money in bad years and in good years. Price volatility is one factor with prices falling with good harvests. The lack of adequate storage facilities can result in problems, especially for small farmers in delivering their wheat to markets and having it priced before it degrades because grain storage capacity is exceeded. It was noted that farmers need access to subsidized capital to increase yields, more affordable equipment, chemicals, and energy prices, better economic/price forecasts, and more effective price support policies from the government

**Economic safety net** – The poor quality of crop insurance was noted as a significant problem during drought years and extreme events (such as hail storms, extreme heat events, and heavy rains). Participants did not fully articulate the specific concerns about insurance, but in follow-up meetings with the Farmers Union of Kazakhstan, we learned that the current program only covers up to 50% of “typical” production costs for each crop and region. Apparently, costs are not indexed so typical costs are based on a survey of production costs in 2006. There are currently discussions underway to consider reforms to the crop insurance program.

Other problems raised by workshop participants were:

- Crop diseases
- Climate conditions, including climate variability, a lack of moisture in the soil, and drought.
- System of land rents which discourages good soil/land stewardship
- Need for improved zoning of crops according to soil, climate and varieties

## **EXERCISE: DECISION MAKING AT THE FARM LEVEL**

The exercise on decision making at the farm level was conducted during the three regional workshops (In Astana, there were no farmers and the plenary discussion on food security was substituted for the decision-making exercise). The objectives of this exercise were to: 1) identify the sources of information that are used by farmers in decision-making, 2) determine the most useful sources of information for farmers, and 3) understand how farmers use information (in particular, climate information) to make decisions. This exercise was helpful for two reasons. First, understanding how decisions are made at the farm level under different timescales can help to guide improvements in weather and climate information and forecasts. Second, determining the reliance on sources and types of information in decision making can help to identify gaps in information, potential areas of improvement, and mechanisms for disseminating information.

The CRW Project team introduced the exercise and asked participants to consider the following types of decisions in both the short- and long-term in the discussion: allocation of land to different crops, selection of crop varieties, timing of planting/harvesting, soil management/cultivation practices, chemical inputs, and investments in equipment.

The small group exercise was divided into three topics: sources of information used to make decisions, types of information used to make decisions and how that information is used in decision making, and

how climate information is used in decision making. The small groups provided input for each of these three topics and recorded information on the flip charts (typically one flip chart sheet per activity). The CRW Project team led a plenary session where each small group presented their results and participants provided commentary toward a more general discussion.

**FINDINGS:** The results from this exercise are divided into three parts:

### **PART 1: SOURCES OF INFORMATION**

Across the three regional workshops there were select sources of information that were consistently mentioned. These included:

- The internet and other mass media sources (TV, radio, newspapers, agricultural bulletins), regional workshops, recommendations from research institutes and the extension center
- Farmer-to-farmer exchanges
- The Local Department of Agriculture and the Ministry of Agriculture were also mentioned, as were, KazHydromet, KasAgroMarketing, and KazAgroInnovation
- Finally, information was also supplied by individual farmer's experiences, the Farmers Union, and scientific research articles, magazines, and literature

### **PART 2. TYPES OF INFORMATION.**

The participants mentioned diverse types of information in this portion of the small group discussion.

- A number of the information types were related to climate and/or weather. For example, participants noted that they sought out daily and weekly weather forecasts for temperature, precipitation, and wind speed. One group noted that they used Russian websites for this information as they were more accurate. Participants also mentioned seasonal climate data and forecasts, as well as the observation diary (for information on historical temperature and precipitation).
- Participants also used information on state support, including subsidies, donations, leasing, credit, or taxes, as well as other types of crop protection.
- New technological process, which includes farming practices (e.g., on plowing, planning, irrigation/drainage, and diversification) and equipment, were also mentioned as important types of information.
- Information on field operations, such as planting/seeding and harvesting times, types of seeds, grain varieties, and pest and disease forecasts.
- Finally, another type of information participants used were market trends, specifically wheat prices. One group mentioned that they use websites from Ukraine and Russia to determine which crops are predicted to be the most lucrative crops for a given year.

### **PART 3. CLIMATE INFORMATION AND DECISION-MAKING.**

- The participants in the regional workshop found part 3 on climate information and decision-making to be difficult as many of the responses were repetitive of the two previous parts of this small group exercise.

- Furthermore, while most of the exercises showed consistency in responses across groups and regions this element of the workshop showed differences between the groups and regional workshops in terms of the information given. For example, one region stated that crops are to be planted at certain time of year and that the government will tell farmers when to plant their crops. Other regions mentioned that they use climate information to find out when they plant (they use soil moisture as an indicator).
- There was a general consensus that climate and meteorological data was neither highly regarded/trusted nor available. In more cases farmers explained that they use independent decision-making that does not necessarily fall in line with the information that was given to them. They stressed that this independent decision-making was guided most strongly by observations on the condition of the field.

## **EXERCISE: PERCEPTION OF CLIMATE CHANGE AND POTENTIAL IMPACTS ON THE WHEAT SECTOR**

The small group exercise, perceptions of changes in weather and impacts on the wheat sector, was conducted in each of the regional workshops and in Astana. The objectives of exercise were to identify any perceived changes in weather and determine the resulting impacts on different assets related to the wheat sector. Understanding historical patterns and current changes in weather and their resulting impacts can often help to characterize how climate may change in the future and how assets may be impacted by or vulnerable to future climate change.

The CRW Project team introduced the small group discussion. Each small group was asked to discuss how weather has changed (or is changing) and how those changes in weather have impacted the wheat sector. They were given some direction on the climate-related factors and assets that should be considered in the discussion. Small groups recorded their discussion onto flip charts.

Each group was asked to present their findings to the larger group. The CRW Project teams helped to facilitate the larger plenary discussion around these findings.

In some of the time-constrained workshops, the exercise was altered by asking participants to speak with their neighbors about the perception of climate change and the potential impacts on the wheat sector. The plenary session encouraged individuals to share what they learned in the discussion but also heavily draw on the experience of experts to get the key points across in a short period of time.

**FINDINGS:** The results from this exercise are divided into perceptions of climate change and potential impacts on the wheat sector (this exercise was not conducted in Kostanay):

Perceptions of climate change:

- An earlier spring
- More frequent droughts
- Higher temperatures
- A longer growing period
- Variability in precipitation throughout the year
- Inter-seasonal variability

- Shifts in seasons/rainfall
- More extreme weather events (e.g., hail)
- Reduced soil moisture
- More intense winds

Potential impacts on the wheat sector:

- Weather affects harvest quantity and quality (sometimes positively, sometimes negatively)
- The need to shift the time of planting
- Drought and other extreme events harm crops, lead to erosion, and decrease harvest leading to financial hardship for farmers, who can't recover
- Wheat diseases have increased
- Farmers do not use weather forecast information and do not know how to adjust to changes in climate
- Climate-resilient sorts of grain are not available or are too expensive

## **EXERCISE: ASSESSING VULNERABILITY TO CLIMATE CHANGE AND VARIABILITY**

The small group exercise on assessing vulnerability to climate change and variability was carried out only in the Astana workshop. The objectives of the exercise were to identify important wheat sector assets, determine climate impacts of concern, and identify factors contributing to vulnerability. Assessing the vulnerability of assets helps to: identify the highly vulnerable assets, determine the most significant drivers of vulnerability, and facilitate the identification and evaluation of adaptation measures to reduce climate risk.

In small groups, participants identified important assets related to the wheat sector and recorded these assets on a flip chart. They were then asked to identify the most important climate impacts related to the wheat sector, some of which were introduced in the presentation given by Dr. Glen Anderson. The small groups selected three climate impacts that they wanted to focus on and described the nature, direction, and magnitude of the impact. Participants were then asked to work through a Vulnerability Workshop by selecting three assets from the flip chart, identifying whether each asset is exposed to the climate impacts previously selected, assessing each asset's level of sensitivity and adaptive capacity, and then assessing the overall vulnerability of each asset to the climate impacts.

In the plenary, small groups discussed which assets were the most vulnerable, spoke about the most significant drivers of vulnerability, and identified any areas where there was confusion or disagreement.

**FINDINGS:** The results from this exercise are presented according to the asset that small groups focused their discussions of climate vulnerability:

Most groups identified **seeds** as a vulnerable asset. Adaptation options include:

- Introduction and utilization of better technologies (including water and resource saving technologies)

- Selection of seeds in labs, including genetically modified drought resistant and climate resilient seeds
- Higher quality seeds
- Higher stubble, mulching, and soil moisture accumulation measures
- Weather forecasting and climate information

Most groups identified **soil** as a vulnerable asset, with the climate impacts of wind/water erosion, changes in soil structure. Adaptation options include:

- Introduction and utilization of new technologies (including water and resource saving technologies, to preserve moisture in the soil)
- Crop rotation (including pulse crops and bean cultures)
- Higher stubble, mulching
- The use of fertilizers
- Wind-protective measures (shelter belts, higher stubble)
- Chemicals and pesticides to prevent disease
- Mechanical processing of the soil, for water accumulation, and to preserve the moisture in the soil, water saving/retention, increased fertility

One group identified **water** as a vulnerable asset, with the climate impacts of temperature increase and increases in precipitation, which lead to drought and overwatering, respectively. Adaptation options include:

- Introduction and utilization of new technologies to preserve moisture in the soil
- The use of climate resilient seed varieties
- Ground cover (leaving old grass to preserve moisture in the soil)
- Higher quality seeds
- Shifting/changing the planting period

## **EXERCISE: OPTIONS FOR ADDRESSING VULNERABILITY**

The small group exercise was carried out in two of the three regional workshops and the workshop in Astana. The objectives of the exercise were to provide participants with hands-on experience in identifying adaptation measures and linking them directly to exposure, sensitivity, and adaptive capacity. Adaptation can reduce exposure and sensitivity, or increase adaptive capacity by: facilitating the gathering and sharing of information, creating a supportive institutional and management framework, creating supportive social structure, offsetting losses by sharing or spreading the risks or losses, avoiding or reducing one's exposure to climate risks, or exploiting new opportunities.

In the Astana workshop, participants were asked to fill out the Identifying Adaptation Options Worksheet by identifying two or more adaptation measure that reduced the vulnerability of the assets looked at in the previous exercise to the relevant climate change impact. Participants were encouraged to consider a range of adaptation categories. For each option, participants were to indicate whether the measure reduces exposure, reduces sensitivity, or increases adaptive capacity. Participants then discussed the results of their Worksheets in their small groups.

One group member was asked to report a summary of their group's findings to the larger plenary. They were asked to focus on some of the most relevant, innovative, and/or population adaptation measures that were recorded, as well as those that were the most effective.

The exercise was altered for the three regional workshops to make it more straightforward and effective. In the revised exercise, Dr. Glen Anderson's presentation highlighted three assets, related to the wheat sector that were vulnerable. These included soil, farmers, and crops (i.e., product). In small groups, participants were asked to discuss adaptation options that would reduce the vulnerability of these assets. Participants recorded a number of adaptation options for each asset on a flip chart. Each group presented the results of their flip charts during plenary and engaged in a broader discussion on adaptation options, which was led by a member of the CRW Project team.

**FINDINGS:** The results from this exercise are presented according to the asset that small groups focused their discussions of adaptation options (note, this exercise was not conducted in Shorthandy because of inclement weather that shortened the workshop):

### *Soil*

- Most of the adaptation options for soil focused on water saving activities. These activities included using no till technologies and practices, practicing mulching, facilitating snow retention, using irrigation more prominently, and employing snow screens.
- Additional options included using chemicals for weed control, disease control, and pest control.
- Liming was also suggested as an option to address soil vulnerability.
- Finally, the use of new and more appropriate equipment for seeding, harvesting, and cultivating was also suggested.

### *Plants/crops*

- There were a number of options focused on seeds that suggested by participants for reducing the vulnerability of crops. These include the higher quality seeds, filtering seeds, and drought resilient seed varieties.
- Diversification of crops, crop switching, and better selection of crop grades were also mentioned as options.
- Options to reduce vulnerability also included more appropriate use and higher quality herbicides, growth stimulating substances, and micro-bio fertilizers.
- Farming practices were also mentioned. These included good soil management in summer, shifting planning periods to take into account seasonal forecasts and climate change, more flexibility in planting times, and a timely harvest.
- Other options included developing methods to protect plants, using water saving technologies, and implementing plant-protecting agents.

### *Farmers*

- Participants had a more difficult time developing options for reducing farmer’s vulnerability to climate change.
- The option mentioned more frequently was using crop insurance to protect farmers from low yields. Other options included using crop storage and processing more effectively.
- Participants also mentioned the need for more and higher quality education for farmers, demonstrations on how to apply new technologies, and guidance on using best practices.
- Other options focused on the need to develop better forecasts so farmers can make more informed decisions on wheat farming.

## **PLENARY DISCUSSION OF FOOD SECURITY IN CENTRAL ASIA AND KAZAKHSTAN’S ROLE IN MEETING DEMAND FOR WHEAT**

The CRW Project team led a plenary discussion on Food Security in Central Asia and Kazakhstan’s role. At the beginning of the session, the facilitator quickly reminded participants that the CRW Project Component 3, Region Dialogue on Wheat, Climate Change, and Regional Food Security, focuses on the impact of climate on the wheat sector throughout Central Asia. The facilitator also mentioned that: 1) all Central Asia Republics (CARs) will strive to achieve food self-sufficiency; 2) Kazakhstan will likely be less impacted by climate change in comparison to other CARs, given better growing conditions and substantially more land devoted to rain-fed grain production; and 3) Kazakhstan Other CARs will be challenged to meet cereal/flour requirements from domestic sources because of rising temperatures, extreme heat events and drought, plus limited and diminishing supplies of water for irrigation.

The facilitator then posed the main question of the discussion: On the assumption that Kazakhstan will continue to generate wheat surpluses, what are the relative advantages/disadvantages of different options for managing surpluses? The facilitator encouraged the group to think about:

- Maintaining reserves large enough to weather extreme reductions in yields,
- Maximizing export value by selling into international markets,
- Shifting surplus cultivation to higher valued grains and oil crops,
- Mixed strategy of reserves, spot markets driven by prices, and
- Development of long term agreements to supply wheat to CAR.

## **ADAPTATION GAME**

An Adaptation Game (or interactive exercise) was also intended to be played in each of the three regional workshops, as well as the Astana workshop. Due to time constraints the game was only played at one of the regional workshops. The game was meant to serve as an interactive, playful tool that would help to communicate a few key messages related to climate change and adaptation. The key takeaways include:

- Climate change is projected to increase climate variability in the future
- These changes in climate will have wide-reaching impacts on many aspects of society, including farming

- Although tools, such as seasonal forecasts, can help to better understand seasonal variability there is still an inherent uncertainty in weather,
- Luckily, there are a number of options for managing climate-related risks.

The game that was played depicts a simple representation of reality. In the game each player is an individual wheat farmer that has a relationship with other wheat farmers in their region (represented by groups of three), which is prone to droughts. A number of rounds are played during the game, where farming-related decisions are made in the face of uncertain in each year (i.e., each round). Each player has finite resources that they want to maximize.

A facilitator walks the players through a series of rounds that involve rolling a regional die in a cup, which represents regional rainfall, and a local die, which represents local rainfall. Depending on the number rolled between the local and regional dice, a farmer will experience drought and need to deduct resources from their savings. Different “tools” are available to participants throughout the game. Climate information, or a clear cup to roll the regional die in, is determined by a bidding process; whereas drought-resistant seeds are offered at a cost in each round. Climate change becomes a part of the game when the 6-sided regional die is replaced with an 8-sided die and the chance of drought becomes greater. More detailed directions for the game can be found in Appendix D.

## **WORKSHOP CONCLUSIONS AND NEXT STEPS**

**Conclusion #1:** Even in the absence of climate change, Kazakh wheat faces a litany of challenges in developing the attributes of a strong, commercially sustainable sector, including:

- Updating and improving the quality of aging and depreciated farm machinery and equipment, with access to financing and affordable equipment significant obstacles;
- Increasing access to high quality seed, enabling farmers to adapt to drought, diversify crop varieties, and take advantage of favorable growing conditions for high valued crops;
- Improving soil/land management practices and crop cultivation methods;
- Accessing affordable and higher quality farm inputs such as herbicides and pesticides;
- Building capacity for more highly skilled workforce in agriculture;
- Improving the economics of wheat production, including the economic safety net in response to extreme events.

**Next Steps:** Although there are no plans to prepare an adaptation strategy for the wheat sector under CRW, it is proposed to develop a report on adaptation options that is structured similarly to the USAID Mainstreaming Framework and assesses options in the context of sector objectives, inputs and enabling conditions, and accounts for both climate and non-climate stressors.

**Conclusion #2:** In the three wheat regions, and to lesser extent in Astana, awareness and understanding of climate change and variability is limited. Some participants in the regional workshops noted that the presentation on climate change was their first exposure to the issue, apart from media coverage.

**Next Steps:** If there is interest in KazAgroInnovation, CRW might consider helping them to develop a module on climate change and variability to include in their suite of training courses.

**Conclusion #3:** Discussions with farmers confirmed the concerns raised during the December 2012 Mission about the poor quality and availability of weather and climate information and particularly seasonal precipitation forecasts. Even if the quality and availability of weather and climate information is improved, a lag in the use of this information by farmers can be anticipated. As one farmer noted, if the information is good, we will use it, but only after its accuracy has been proved over a few seasons. Given the stochastic nature of weather and the fact that even the best forecasts are occasionally wrong, early adoption rates will likely be low.

**Next Steps:** CRW and CCRD are organizing a roundtable on weather and climate information in Almaty, May 22-23 with follow-up meetings on May 24 to gauge interest among Kazakh experts their institutions in technical assistance to strengthen forecasting capabilities and improve the dissemination of weather and climate information. If this work goes forward, we should encourage Kazakh partners to inform farmers of this work and provide periodic updates.

**Conclusion #4:** While we heard about the work of the regional research institutes and research that is conducted on experimental plots, workshop discussions confirmed earlier conclusion from the December 2012 Mission that Kazakhstan does not presently have in-house capabilities to run crop simulation models that are a key tool, internationally, in understanding the potential impacts of climate change and variability on the wheat sector.

**Next Steps:** CCRD has had discussion with the Goddard Institute for Space Studies and the University of Florida about assisting Kazakhstan to develop in-house crop simulation capabilities. To create interest in crop simulation modeling, Glen Anderson will make a presentation at the upcoming Roundtable to describe these models and the steps that would be involved in selecting the best models (at least two are recommended) for Kazakhstan and the process for calibrating the models (using experiment station plots during the 2014 growing season).

# ANNEX A: AGENDAS

## Climate Resilient Wheat Project Workshop on Climate Change and Variability: Agenda Astana, Kazakhstan – Friday, February 22, 2013

### Overview

The Climate Resilient Wheat (CRW) Project, implemented by UNDP with funding from USAID, is convening a series of workshops to facilitate discussions with stakeholders on the challenges facing the wheat sector in Kazakhstan, with primary focus on the impacts of climate change and variability.

This workshop brings together national-level policymakers and other stakeholders that support the wheat sector and covers discussions on general challenges facing the wheat sector, climate impacts, vulnerability, and options for addressing climate impacts, food security in Central Asia and Kazakhstan's role as a wheat exporter. Additional workshops will engage farmers and local authorities in discussions of the impacts of climate change on farm-level decision-making.

These workshops are a collaborative effort between the CRW Project Team and the USAID-funded and Washington, DC based Climate Change Resilient Development Project, with support from the Ministry of Agriculture and KazAgroInnovation.

Session	Time	Activity	Session Leader
1	0930-1000	Welcome, participant introductions, workshop objectives, and agenda	UNDP, USAID
2	1000-1100	Small group exercise #1 – Develop consensus on 5 top problems facing wheat producers in Kazakhstan	Training Team
	1100-1115	Coffee Break	
3	1115-1145	Small group exercise #2 – Perceptions of changes in weather and impacts on wheat sector	Training Team
4	1145-1230	Adaptation Game	Training Team
	1230-1330	Lunch	
5	1330-1415	Presentation: Climate change and variability, impacts, vulnerability, and adaptation planning	Glen Anderson
6	1415-1515	Small group exercise #3 – Vulnerability of the wheat sector to climate change and variability	Training Team
7	1515-1630	Small group exercise #4 – Options for reducing vulnerability	Training Team
8	1630-1700	Plenary discussion – Food security in Central Asia and Kazakhstan's role	Training Team
9	1700-1730	Wrap-up	Glen Anderson

## Climate Resilient Wheat Project

### Workshop on Climate Change and Variability: Agenda

#### Kostanay, Kazakhstan – Monday, February 25, 2013

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### Overview

The Climate Resilient Wheat (CRW) Project, implemented by UNDP with funding from USAID, is convening a series of workshops to facilitate discussions with stakeholders on the challenges facing the wheat sector in Kazakhstan, with primary focus on the impacts of climate change and variability. Previously, the CRW Project convened a meeting with national-level policymakers and stakeholders to discuss climate impacts on the wheat sector and Kazakhstan’s role in food security in Central Asia.

This is the first of three workshops which brings together farmers and local authorities to discuss the general challenges facing wheat growers and the impacts of climate change and variability on farm-level decision-making. Additional workshops for farmers and local authorities will be held in Shorthandy and Petropavlovsk later this week.

These workshops are a collaborative effort between the CRW Project Team and the USAID-funded and Washington, DC based Climate Change Resilient Development Project, with support from the Ministry of Agriculture and KazAgroInnovation.

Session	Time	Activity	Session Leader
1	0900-0930	Welcome, participant introductions, workshop objectives and agenda	<i>UNDP</i>
2	0930-1015	Small group exercise #1 – Develop consensus on 5 top problems facing wheat producers in Kazakhstan	Training Team
	1015-1045	Coffee Break	
3	1045-1130	Small group exercise #2 – Annual and multi-year decision-making at the farm level	Training Team
4	1130-1200	Small group exercise #3 – Perceptions of changes in weather and impacts on wheat sector	Training Team
5	1200-1245	Adaptation Game	Training Team
	1245-1345	Lunch	
6	1345-1430	Presentation: Climate change and variability, impacts, vulnerability, and adaptation	Glen Anderson
7	1430-1500	Small group exercise #4 – Options for reducing vulnerability	Training Team
8	1500-1530	Wrap-up	UNDP

# Climate Resilient Wheat Project

## Workshop on Climate Change and Variability: Agenda

### Shorthandy, Kazakhstan – Wednesday, February 27, 2013

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#### Overview

The Climate Resilient Wheat (CRW) Project, implemented by UNDP with funding from USAID, is convening a series of workshops to facilitate discussions with stakeholders on the challenges facing the wheat sector in Kazakhstan, with primary focus on the impacts of climate change and variability. Previously, the CRW Project convened a meeting with national-level policymakers and stakeholders to discuss climate impacts on the wheat sector and Kazakhstan’s role in food security in Central Asia.

This is the second of three workshops which brings together farmers and local authorities to discuss the general challenges facing wheat growers and the impacts of climate change and variability on farm-level decision-making. Additional workshops for farmers and local authorities are being held in Kostanay and Petropavlovsk.

These workshops are a collaborative effort between the CRW Project Team and the USAID-funded and Washington, DC based Climate Change Resilient Development Project, with support from the Ministry of Agriculture and KazAgroInnovation.

Session	Time	Activity	Session Leader
1	1000-1030	Welcome, participant introductions, workshop objectives, and agenda	<i>UNDP</i>
2	1030-1115	Small group exercise #1 – Develop consensus on 5 top problems facing wheat producers in Kazakhstan	Training Team
	1115-1145	Coffee Break	
3	1145-1230	Small group exercise #2 – Annual and multi-year decision-making at the farm level	Training Team
4	1230-1300	Small group exercise #3 – Perceptions of changes in weather and impacts on wheat sector	Glen Anderson
	1300-1400	Lunch	
5	1400-1445	Adaptation Game	Training Team
6	1445-1530	Presentation: Climate change and variability, impacts, vulnerability, and adaptation	Training Team
7	1530-1700	Small group exercise #4 – Options for reducing vulnerability	Training Team
8	1700-1730	Wrap-up	UNDP

## Climate Resilient Wheat Project

### Workshop on Climate Change and Variability: Agenda

#### Petropavlovsk, Kazakhstan – Friday, March 1, 2013

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### Overview

The Climate Resilient Wheat (CRW) Project, implemented by UNDP with funding from USAID, is convening a series of workshops to facilitate discussions with stakeholders on the challenges facing the wheat sector in Kazakhstan, with primary focus on the impacts of climate change and variability. Previously, the CRW Project convened a meeting with national-level policymakers and stakeholders to discuss climate impacts on the wheat sector and Kazakhstan’s role in food security in Central Asia.

This is the third of three workshops which brings together farmers and local authorities to discuss the general challenges facing wheat growers and the impacts of climate change and variability on farm-level decision-making. Additional workshops for farmers and local authorities were previously held in Kostanay and Shorthandy.

These workshops are a collaborative effort between the CRW Project Team and the USAID-funded and Washington, DC based Climate Change Resilient Development Project, with support from the Ministry of Agriculture and KazAgroInnovation.

Session	Time	Activity	Session Leader
1	0900-0930	Welcome, participant introductions, workshop objectives, and agenda	<i>UNDP</i>
2	0930-1015	Small group exercise #1 – Develop consensus on 5 top problems facing wheat producers in Kazakhstan	Training Team
	1015-1045	Coffee Break	
3	1045-1130	Small group exercise #2 – Annual and multi-year decision-making at the farm level	Training Team
4	1130-1200	Small group exercise #3 – Perceptions of changes in weather and impacts on wheat sector	Glen Anderson
	1200-1245	Lunch	
5	1245-1345	Adaptation Game	Training Team
6	1345-1430	Presentation: Climate change and variability, impacts, vulnerability, and adaptation	Training Team
7	1430-1500	Small group exercise #4 – Options for reducing vulnerability	Training Team
8	0900-0930	Wrap-up	UNDP

# ANNEX B: PARTICIPANT LISTS

## List of participants - Astana Workshop on “Climate impact on wheat production”

*Location: Conference room “Washington”, Hotel “Ramada Plaza”, Astana, 47 Abai street*

*Date: February 22, 2013*

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## List of participants – Kostanay

### Workshop on “Climate impact on wheat production”

Location: Kazakh Research Institute of Agriculture, Zarechny town, Kostanay region (oblast)

Date: February 25, 2013

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27.			
<b>Invited trainers</b>			
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**List of participants - Shortandy**  
**Workshop on “Climate impact on wheat production”**

*Location: A.Barayev Kazakh Research Institute*

*Date: February 27, 2013*

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**List of participants - Petropavlovsk  
Workshop on “Climate impact on wheat production”**

*Location: Hotel Skif, Petropavlovsk city*

*Date: March 1, 2013*

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# ANNEX C: INSTRUCTIONS

## Facilitator Instructions for Stakeholder Workshops on Climate Change and Wheat Production

<b>Exercise</b>	Small Group Exercise #1 (All locations) – Top problems facing wheat producers Time for Exercise: 60 minutes in Astana; 45 minutes in other workshops
<b>Objectives</b>	<ul style="list-style-type: none"><li>• Small group introductions</li><li>• Discuss problems facing wheat producers in Northern Kazakhstan</li><li>• Identify top 5 problems</li></ul>
<b>Teaching Points</b>	<ul style="list-style-type: none"><li>• Understanding the top problems/challenges facing wheat producers in Northern Kazakhstan will help to:<ul style="list-style-type: none"><li>○ Set context for the workshop</li><li>○ Identify any problems that may be exacerbated by future climate change in subsequent exercises</li></ul></li></ul>
<b>Tasks</b>	<p>Part 1: Introduction (10 minutes for all workshops)</p> <ul style="list-style-type: none"><li>• Introduce yourself as the facilitator</li><li>• Ask other participants in group to (1) introduce themselves and (2) briefly describe their expectations for the workshop</li></ul> <p>Part 2: Small Group Discussion for <b><u>Astana</u></b> (35 minutes)</p> <ul style="list-style-type: none"><li>• Ask participants to discuss past and current problems and challenges facing wheat producers in Kazakhstan.</li><li>• After 30 minutes, have each participant write their top five problems on small post-it cards and place on the five flipchart sheets labeled #1 through #5</li><li>• Alternatively, if the small group reaches consensus on the five top problems, they can write them on larger post-it cards and post them on the flipchart sheets</li></ul> <p>Part 3: Plenary Discussion for <b><u>Astana</u></b> (15 minutes)</p> <ul style="list-style-type: none"><li>• CRW Project team will lead a discussion of the priority problems as reported by the small groups on the five flipcharts</li><li>• Participants should be encouraged to contribute to the discussion so the review by the project team should be carried out in about 5 minutes</li><li>• Wrap-up – relate the discussion of problems to the tasks to be undertaken by CRW</li></ul> <p>Part 2: Small Group Discussion for <b><u>Kostanay, Shorthandy, and Petropavlovsk</u></b> (25 minutes)</p> <ul style="list-style-type: none"><li>• Ask participants to discuss past and current problems and challenges facing wheat producers in Kazakhstan.</li><li>• Each small group should develop a consensus ranking of five problems and list on flip chart</li></ul>

Part 3: Plenary Discussion for Kostanay, Shorthandy, and Petropavlovsk (10 minutes)

- Small groups report to plenary on their top five problems

**Definitions**

N/A

**Materials**

- Flip charts
- Markers
- Small and large colored post-it notes

## Facilitator Instructions for Stakeholder Workshops on Climate Change and Wheat Production - Astana

<b>Exercise</b>	<p>Small Group Exercise #2 – Perceptions of changes in weather and impacts on the wheat sector: Top problems facing wheat producers</p> <p>Time for Exercise: 30 minutes</p>
<b>Objectives</b>	<ul style="list-style-type: none"> <li>• Identify any perceived changes in weather</li> <li>• Determine the resulting impacts on different assets related to the wheat sector</li> </ul>
<b>Teaching Points</b>	<ul style="list-style-type: none"> <li>• Understanding historical patterns and current changes in weather and their resulting impacts can often help to characterize how:             <ul style="list-style-type: none"> <li>○ Climate may change in the future</li> <li>○ Assets may be impacted by future climate change</li> <li>○ Assets may be vulnerable to future climate change</li> </ul> </li> </ul>
<b>Tasks</b>	<p>Part 1: Small Group Discussion (20 minutes)</p> <ul style="list-style-type: none"> <li>• Ask participants to talk in their small groups about:             <ul style="list-style-type: none"> <li>○ How weather has changed (or is changing) and</li> <li>○ How changes in weather have impacted the wheat sector</li> </ul> </li> <li>• Record notes from discussion on flip chart</li> </ul> <p><i>Notes to guide discussion:</i></p> <ul style="list-style-type: none"> <li>• Consider climate-related factors, such as:             <ul style="list-style-type: none"> <li>○ Changes in soil/air temperature, precipitation (floods/droughts), and/or storms</li> <li>○ Seasonal shifts/changes</li> <li>○ Changes in maximums/minimums</li> </ul> </li> <li>• Consider impacts on various assets related to the wheat sector, such as:             <ul style="list-style-type: none"> <li>○ Wheat production/yield</li> <li>○ Inputs (e.g., water, seeds, labor, capital, land, soil, energy, machines and equipment)</li> <li>○ Irrigation and/or harvest processes</li> <li>○ Transportation and distribution of harvest</li> <li>○ Market prices</li> </ul> </li> </ul> <p>Part 2: Report to Plenary (10 minutes)</p> <ul style="list-style-type: none"> <li>• Ask one group member to report your group’s findings to the larger plenary             <ul style="list-style-type: none"> <li>○ Focus on the most significant changes in weather and their associated impacts to the sector</li> </ul> </li> </ul>
<b>Definitions</b>	N/A
<b>Materials</b>	<p>Flip charts</p> <p>Markers</p>

# Facilitator Instructions for Stakeholder Workshop in Astana on Climate Change and Wheat Production

**Exercise** Small Group Exercise #3 – Vulnerability of wheat sector to climate change

Time for Exercise: 60 minutes

- Objectives**
- Identify important wheat sector assets
  - Determine climate impacts of concern
  - Identify factors contributing to vulnerability

- Teaching Points**
- Assessing the vulnerability of assets helps to:
    - Identify the highly vulnerable assets
    - Determine the most significant drivers of vulnerability
    - Facilitate the identification and evaluation of adaptation measures to reduce climate risk

- Tasks**
- Part 1: Identify Assets (10 minutes)
- In small groups, ask participants to identify important assets related to the wheat sector (see definition box below)
  - Record assets on the flip chart
- Part 2: Determine Climate Impacts of Concern (5 minutes)
- Ask participants to identify the most important climate impacts related to the wheat sector (refer to presentation)
  - Record climate impacts on the flip chart
  - As a group select the three climate impacts you will address in Part 3
    - Be sure to include a description of the nature, direction, and magnitude of the impact (e.g., higher temperatures)
- Part 3: Vulnerability Worksheet Activity (20 minutes)
- Give each participant a Vulnerability Worksheet and a pen/pencil and ask them to work through the following process for three assets
  - Select the three assets from the flip chart and enter them on the worksheet in column 1
  - Record the three climate impacts of concern decided by your group in column 2 (repeat for all three assets)
  - Identify whether each asset is exposed to the climate impacts in column 2 by circling yes or no (column 3)
    - If a climate impact is not relevant to the asset, leave the row blank
  - Next, identify whether sensitivity is high, medium, or low (column 4)
  - Next, assess adaptive capacity (column 5)
  - Assess overall vulnerability (column 6)
    - Remember that higher adaptive capacity can lead to low vulnerability
- Part 4: Small Group Discussion (15 minutes)
- Discuss the results of the individual Vulnerability Worksheets in small groups
  - *Notes: Consider the following leading questions*

- Which assets were the most vulnerable?
- Was there disagreement among participants on the level of vulnerability for certain assets? Why?

Part 5: Report to Plenary (10 minutes)

- Ask one group member to report a summary of your group’s findings to the larger plenary
  - Focus on identifying the most vulnerable sectors and the most significant drivers of vulnerability

**Definitions**

**Assets** include people, businesses and livelihoods, infrastructure, and natural resources and systems

**Exposure** mainly refers to physical, chemical, and biological impacts on assets

**Sensitivity** for two similarly exposed assets – for example, trees with deep roots are less sensitive to wind damages than trees with shallow roots

**Adaptive Capacity** is the ability of people, communities, or systems to respond to and reduce the risks of exposure and/or sensitivity to climate change

**Elements of adaptive capacity** include: 1) Access to information; 2) Access to financial, technical, and human resources; 3) Social capital and cohesion; 4) Redundancy of transportation and information systems; and 5) Economic diversification

**Vulnerability** increases with increased exposure and sensitivity and decreases with increased adaptive capacity



**Materials**

- Flip charts
- Markers
- Vulnerability Worksheet
- Pen/Pencil

## Vulnerability Worksheet

1. Asset	2. Climate impact	3. Exposure	4. Sensitivity	5. Adaptive Capacity	=	6. Vulnerability
#1		Yes No	High Medium Low	Low Medium High	=	High Medium Low
		Yes No	High Medium Low	Low Medium High	=	High Medium Low
		Yes No	High Medium Low	Low Medium High	=	High Medium Low
#2		Yes No	High Medium Low	Low Medium High	=	High Medium Low
		Yes No	High Medium Low	Low Medium High	=	High Medium Low
		Yes No	High Medium Low	Low Medium High	=	High Medium Low
#3		Yes No	High Medium Low	Low Medium High	=	High Medium Low
		Yes No	High Medium Low	Low Medium High	=	High Medium Low
		Yes No	High Medium Low	Low Medium High	=	High Medium Low

## Facilitator Instructions for Stakeholder Workshops on Climate Change and Wheat Production - Astana

<b>Exercise</b>	Small Group Exercise #4 – Options for reducing vulnerability in the wheat sector  Time for Exercise: 45 minutes
<b>Objectives</b>	<ul style="list-style-type: none"><li>• Provide participants with hands-on experience in identifying adaptation measures and linking them directly to exposure, sensitivity, and adaptive capacity</li></ul>
<b>Teaching Points</b>	<ul style="list-style-type: none"><li>• Adaptation can reduce exposure and sensitivity, or increase adaptive capacity by:<ul style="list-style-type: none"><li>○ Facilitating the gathering and sharing of information<ul style="list-style-type: none"><li>▪ e.g., undertaking targeted research, collecting and monitoring data, raising awareness through education and training initiatives</li></ul></li><li>○ Creating a supportive institutional and management framework<ul style="list-style-type: none"><li>▪ e.g., changing standards, legislation and best practice guidance, and developing appropriate policies, plans and strategies</li></ul></li><li>○ Creating supportive social structures<ul style="list-style-type: none"><li>▪ e.g., changing internal organizational systems, developing personnel or other resources to deliver the adaptation actions</li></ul></li><li>○ Offsetting losses by sharing or spreading the risks or losses<ul style="list-style-type: none"><li>▪ e.g., through using insurance or other risk sharing tools</li></ul></li><li>○ Avoiding or reducing one's exposure to climate risks<ul style="list-style-type: none"><li>▪ e.g., building new flood defenses or changing location</li></ul></li><li>○ Exploiting new opportunities<ul style="list-style-type: none"><li>▪ e.g., engaging in a new activity, changing practices to take advantage of changing climatic conditions</li></ul></li></ul></li></ul>
<b>Tasks</b>	<p>Part 1: Identify Adaptation Measures for Vulnerable Assets (20 minutes)</p> <ul style="list-style-type: none"><li>• For each asset assessed in the previous exercise, copy the information from the vulnerability worksheets into the shaded boxes on the Identifying Adaptation Options Worksheet</li><li>• For each vulnerable asset, identify two or more adaptation measures that reduce vulnerability to the relevant climate change impact<ul style="list-style-type: none"><li>○ In selecting measures, you are encouraged to consider a range of adaptation categories if they are relevant to reducing the asset's vulnerability to climate change</li></ul></li><li>• For each option, indicate whether the measure reduces exposure, reduces sensitivity, or increases adaptive capacity</li></ul> <p>Part 2: Small Group Discussion (5 minutes)</p> <ul style="list-style-type: none"><li>• Discuss the results of the individual Identifying Adaptation Options Worksheet in small groups</li><li>• <i>Notes: Consider the following leading questions</i><ul style="list-style-type: none"><li>○ Which assets had the most adaptation measures?</li><li>○ Which assets had the most cost effective measures?</li><li>○ Which factors of vulnerability did the adaptation measure address the most?</li></ul></li></ul> <p>Part 4: Report to Plenary (20 minutes)</p> <ul style="list-style-type: none"><li>• Ask one group member to report a summary of your group's findings to the larger plenary</li></ul>

- Focus on some of the most relevant, innovative, and/or popular adaptation measures that were mentioned by members of your group

**Definitions**

**Adaptation** is action to adjust to climate variability and change, to minimize potential damage, take advantage of opportunities, or cope with the consequences. Adaptation actions seek to enhance resilience and reduce climate vulnerability in the near- and long-term by decreasing exposure or sensitivity, or by increasing adaptive capacity.

**Materials**

- Identifying Adaptation Options Worksheet
- Pen/Pencil

## Identifying Adaptation Options Worksheet

<b>Asset:</b>			
<b>Climate Impacts:</b>			
Sensitivity	Adaptive Capacity	Adaptation Options	Indicate the benefits (reduce exposure and/or sensitivity, or build adaptive capacity)
High	Low		
Medium	Medium		
Low	High		

<b>Asset:</b>			
<b>Climate Impacts:</b>			
Sensitivity	Adaptive Capacity	Adaptation Options	Indicate the benefits (reduce exposure and/or sensitivity, or build adaptive capacity)
High	Low		
Medium	Medium		
Low	High		

<b>Asset:</b>			
<b>Climate Impacts:</b>			
Sensitivity	Adaptive Capacity	Adaptation Options	Indicate the benefits (reduce exposure and/or sensitivity, or build adaptive capacity)
High	Low		
Medium	Medium		
Low	High		

## Facilitator (CRW Staff) Instructions for Plenary Discussion on Food Security in Central Asia and Kazakhstan’s Role

**Exercise** Plenary Discussion Astana only

Time for Exercise: 30 minutes

### Tasks

- Quickly remind participants that Component 3. Regional Dialogue on Wheat, Climate Change and Regional Food Security Supported focuses on the impacts of climate change on the wheat sector throughout Central Asia
- All CARs (as well as countries everywhere) will strive to achieve food self-sufficiency
- Kazakhstan will likely be less impacted by climate change in comparison to other CARs, given better growing conditions and substantially more land devoted to rain-fed grain production.
- Other CARs will be challenged to meet cereal/flour requirements from domestic sources because of rising temperatures, extreme heat events and drought, plus limited and diminishing supplies of water for irrigation.

Question: On the assumption that Kazakhstan will continue to generate wheat surpluses, what are the relative advantages/disadvantages of different options for managing surpluses?

- Maintaining reserves large enough to weather extreme reductions in yields
- Maximizing export value by selling into international markets
- Shifting surplus cultivation to higher valued grains and oil crops
- Mixed strategy of reserves, spot markets driven by prices
- Development of long term agreements to supply wheat to CAR

**Definitions** N/A

**Materials** None

# Facilitator Instructions for Regional Stakeholder Workshops on Climate Change and Wheat Production

**Exercise** Small Group Exercise #2 (Kostanay, Shorthandy and Petropavlovsk) – Decision-making at the farm level  
Time for Exercise: 45 minutes

- Objectives**
- Identify the sources of information that are used by farmers in decision-making
  - Determine the most useful sources of information for farmers
  - Understand how farmers use information (in particular, climate information) to make decisions

- Teaching Points**
- Understanding how decisions are made at the farm level under different timescales (e.g., annual and multi-year) can help to improve information.
  - Determining the reliance on sources and types of information (e.g., historical trends, weather forecasts, extension service information, technical advice, diffusion of new technologies) in decision making can help to identify gaps in information and potential areas of improvement.

- Tasks** Small Group Discussion (by topic)
- Introduce the exercise and inform participants that they will be asked to consider the following types of decisions in both the short- and long-term in the discussion.
    - Allocation of land to different crops
    - Selection of crop varieties (within a year/over time)
    - Timing of planting/harvesting
    - Soil management/cultivation practices
    - Chemical inputs
    - Investments in equipment

### *Topic 1: Sources of information*

- Ask participants to discuss different sources of information they use in decision making. Use the following questions to guide the discussion:
  - What networks do farmers use to get information?
  - What institutions (government, donor, NGOs) do farmers use to get information?
  - Do farmers use information provided on TV, radio, papers, bulletins, phones (message or voice); or at NGOs, universities, etc. for decision-making?
  - What data/information do farmers generate themselves to use in making decisions?
  - What are other sources of information that farmers use?
- Record notes from discussion on flip chart

### *Topic 2: Types of information used*

- Ask participants to discuss the types of information they use to make decisions and how that information is used in decision making. Be sure to differentiate between short-term and long-term decisions. Consider the following types of information, among others.
  - Historical data
  - Climate scenarios

- Rainfall probabilities
- Crop modeling
- Length of growing season
- Onset and ending of rains
- Drought frequency and probabilities
- Temperature probabilities
- Agricultural advisories
- Seasonal climate forecast
- Early warnings
- Additional questions that can be used to lead the discussion on types of information farmers use include:
  - Do farmers rely more on daily, monthly mean, or annual mean data?
  - Is the forecast information that farmers receive location-specific?
  - Do farmers use information related to cultivation best practices, crop protection, or seed/crop choice?
  - Do farmers use market information in decision making?
  - Do farmers use information on new technologies and methods?
  - Do farmers use local knowledge?
  - Do farmers use information based on the assessment of natural resources for long term planning/crop diversification?
- Ask participants to discuss if the information they have is sufficient for their decision making needs?
  - If not, what additional information would better help them to make decisions?
  - May also ask if information (including forecasts, early warning, and advisories) is received in a timely manner?
- Record notes from discussion on flip chart

*Topic 3: Climate information and decision making*

- Ask participants to discuss the use of climate information in decision making. Use the following questions to lead the conversation:
  - Do farmers integrate climate information, technical advice, etc. when making decisions?
  - Do farmers trust climate information, extension services, and technical advice provided?
  - Do famers receive training on climate variability and associated risks?
  - Do farmers receive adequate support with risk reduction mechanisms (including inputs, credit, and insurance)?
- Record notes from discussion on flip chart

**Materials**

- Flip charts
- Markers

## Facilitator Instructions for Stakeholder Workshops on Climate Change and Wheat Production – Regional Workshops

<b>Exercise</b>	<p>Small Group Exercise #3 – Perceptions of changes in weather and impacts on the wheat sector: Top problems facing wheat producers</p> <p>Time for Exercise: 30 minutes</p>
<b>Objectives</b>	<ul style="list-style-type: none"> <li>• Identify any perceived changes in weather</li> <li>• Determine the resulting impacts on different assets related to the wheat sector</li> </ul>
<b>Teaching Points</b>	<ul style="list-style-type: none"> <li>• Understanding historical patterns and current changes in weather and their resulting impacts can often help to characterize how:             <ul style="list-style-type: none"> <li>○ Climate may change in the future</li> <li>○ Assets may be impacted by future climate change</li> <li>○ Assets may be vulnerable to future climate change</li> </ul> </li> </ul>
<b>Tasks</b>	<p>Part 1: Small Group Discussion (20 minutes)</p> <ul style="list-style-type: none"> <li>• Ask participants to talk in their small groups about:             <ul style="list-style-type: none"> <li>○ How weather has changed (or is changing) and</li> <li>○ How changes in weather have impacted the wheat sector</li> </ul> </li> <li>• Record notes from discussion on flip chart</li> </ul> <p><i>Notes to guide discussion:</i></p> <ul style="list-style-type: none"> <li>• Consider climate-related factors, such as:             <ul style="list-style-type: none"> <li>○ Changes in soil/air temperature, precipitation (floods/droughts), and/or storms</li> <li>○ Seasonal shifts/changes</li> <li>○ Changes in maximums/minimums</li> </ul> </li> <li>• Consider impacts on various assets related to the wheat sector, such as:             <ul style="list-style-type: none"> <li>○ Wheat production/yield</li> <li>○ Inputs (e.g., water, seeds, labor, capital, land, soil, energy, machines and equipment)</li> <li>○ Irrigation and/or harvest processes</li> <li>○ Transportation and distribution of harvest</li> <li>○ Market prices</li> </ul> </li> </ul> <p>Part 2: Report to Plenary (10 minutes)</p> <ul style="list-style-type: none"> <li>• Ask one group member to report your group’s findings to the larger plenary             <ul style="list-style-type: none"> <li>○ Focus on the most significant changes in weather and their associated impacts to the sector</li> </ul> </li> </ul>
<b>Definitions</b>	N/A
<b>Materials</b>	<p>Flip charts</p> <p>Markers</p>

# Facilitator Instructions for Stakeholder Workshops on Climate Change and Wheat Production – Regional Workshops

<b>Exercise</b>	Small Group Exercise #4 – Options for reducing vulnerability in the wheat sector  Time for Exercise: 30 minutes
<b>Objectives</b>	<ul style="list-style-type: none"><li>• Provide participants with hands-on experience in identifying adaptation measures and linking them directly to exposure, sensitivity, and adaptive capacity</li></ul>
<b>Teaching Points</b>	<ul style="list-style-type: none"><li>• Adaptation can reduce exposure and sensitivity, or increase adaptive capacity by:<ul style="list-style-type: none"><li>○ Facilitating the gathering and sharing of information<ul style="list-style-type: none"><li>▪ e.g., undertaking targeted research, collecting and monitoring data, raising awareness through education and training initiatives</li></ul></li><li>○ Creating a supportive institutional and management framework<ul style="list-style-type: none"><li>▪ e.g., changing standards, legislation and best practice guidance, and developing appropriate policies, plans and strategies</li></ul></li><li>○ Creating supportive social structures<ul style="list-style-type: none"><li>▪ e.g., changing internal organizational systems, developing personnel or other resources to deliver the adaptation actions</li></ul></li><li>○ Offsetting losses by sharing or spreading the risks or losses<ul style="list-style-type: none"><li>▪ e.g., through using insurance or other risk sharing tools</li></ul></li><li>○ Avoiding or reducing one's exposure to climate risks<ul style="list-style-type: none"><li>▪ e.g., building new flood defenses or changing location</li></ul></li><li>○ Exploiting new opportunities<ul style="list-style-type: none"><li>▪ e.g., engaging in a new activity, changing practices to take advantage of changing climatic conditions</li></ul></li></ul></li></ul>
<b>Tasks</b>	<p>Part 1: Discuss Vulnerability (5 minutes)</p> <ul style="list-style-type: none"><li>• In your small groups discuss the concepts that were introduced in the presentation to ensure they are understood among participants. More specifically, discuss vulnerability as a whole as well as the different elements of vulnerability - exposure, sensitivity, and adaptive capacity.</li><li>• Answer any questions that participants may have on these concepts and the examples presented</li></ul> <p>Part 2: Identify Adaptation Measures for Vulnerable Assets (15 minutes)</p> <ul style="list-style-type: none"><li>• Identify 2 vulnerable assets from the list developed in the Astana workshop</li><li>• For each vulnerable asset, identify two or more adaptation measures that reduce vulnerability to the relevant climate change impact<ul style="list-style-type: none"><li>○ In selecting measures, you are encouraged to consider a range of adaptation categories if they are relevant to reducing the asset's vulnerability to climate change</li></ul></li><li>• For each option, indicate whether the measure reduces exposure, reduces sensitivity, or increases adaptive capacity</li><li>• Record your answers on a flip chart (see example flip chart sheet below).</li></ul> <p>Part 3: Report to Plenary (10 minutes)</p> <ul style="list-style-type: none"><li>• Ask one group member to report a summary of your group's findings to the larger plenary<ul style="list-style-type: none"><li>○ Focus on some of the most relevant, innovative, and/or popular adaptation</li></ul></li></ul>

measures that were mentioned by members of your group

**Definitions**

**Adaptation** is action to adjust to climate variability and change, to minimize potential damage, take advantage of opportunities, or cope with the consequences. Adaptation actions seek to enhance resilience and reduce climate vulnerability in the near- and long-term by decreasing exposure or sensitivity, or by increasing adaptive capacity.

**Materials**

- Flip chart
- Markers

Example Flip Chart Sheet

[Name of Asset]	
Adaptation Measure	Benefits of Measure (↓ exposure/sensitivity or↑ adaptive capacity)
[Adaptation Measure #1]	↓ Exposure ↑ Adaptive Capacity
[Adaptation Measure #2]	↓ Sensitivity
[Adaptation Measure #3]	↓ Exposure ↓ Sensitivity

# ANNEX D: PRESENTATIONS



**USAID** | КАЗАХСТАН  
ОТ АМЕРИКАНСКОГО НАРОДА



## Improving the Climate Resiliency of Kazakhstan Wheat and Central Asian Food Security

**Bakhtiyar Sadyk**,  
Principle Technical Project Advisor,  
PhD



**USAID** | КАЗАХСТАН  
ОТ АМЕРИКАНСКОГО НАРОДА



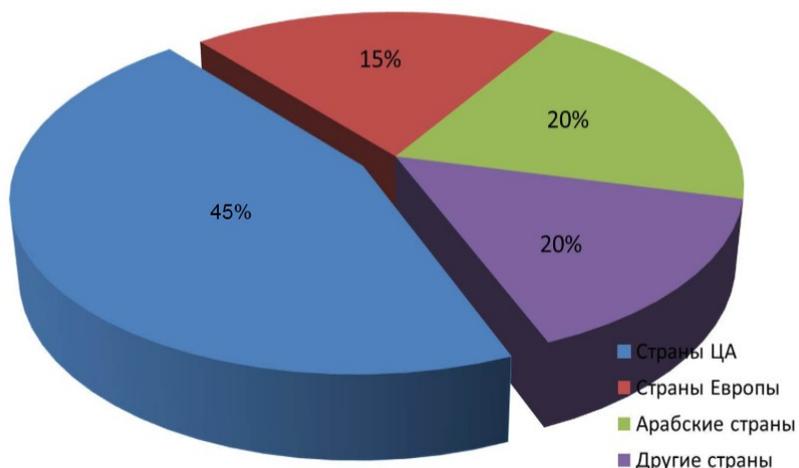
### Impact of Climate Change on cereal crops

- ✓ Rise of air temperature will allow to plant spring wheat 1 week earlier. Under the favorable weather conditions during flowering /maturing period crop yield will increase.
- ✓ Rise of the air temperature and decrease of mean annual precipitation during growing period reduce crop yield that results price increase for food grain.
- ✓ Increase of extreme weather events frequency and intensity for certain year can destroy grain yield.
- ✓ Lack of grain production forecasting model in terms of climate change makes it complicated to arrange activities related to grain production, storage, processing and realization.





### Wheat export pattern in Kazakhstan



### Grain market in Central Asian countries

Countries	Populati on million people	GNP per capita \$	% of wheat per day	Wheat in 2009/2010, th. tonnes		
				Producti on	Import	Export
Afghanistan	30.2	860	59.5	4250	2500	-
Tajikistan	7.6	1950	53.5	700	872	-
Kyrgyzstan	5.4	2200	40.5	1100	350	-
<b>Kazakhstan</b>	<b>16.1</b>	<b>10320</b>	<b>37.3</b>	<b>17052</b>	<b>57</b>	<b>7871</b>
Uzbekistan	28.5	2910	52.5	6200	1677	400
Iran	78.9	4540	49.6	13485	5000	100



### Wheat production variability in CA countries

Countries	Variability index
Afghanistan	0.31
Iran	0.15
<b>Kazakhstan</b>	<b>0.19</b>
Kyrgyzstan	0.20
Tajikistan	0.21
Turkmenistan	0.18
Uzbekistan	0.16
To compare: USA	0.12
Canada	0.15



**The overall objective of the project** is to support Central Asian region food security through improving the Climate Resiliency of Kazakhstan Wheat

**Project period:** 2012 - 2014

**Project donors:** United States Agency for International Development (USAID), UN Development Programme, Government of Kazakhstan

**Budget US\$** 1.102.628



**Project Components:**

**Improved Monitoring and Information Sharing for Climate-Resilient Wheat Production**

**Climate Resilience Developed Through Mainstreaming of Adaptation Measures**

**Regional Dialogue on Wheat, Climate Change and Regional Food Security Supported**



**Welcome to open  
dialogue!**



## *Climate Change and the Wheat Sector of Kazakhstan*

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**Chief of Party, Climate Resilient Development Project**

Kostanay, Kazakhstan  
February 25, 2013

### Outline

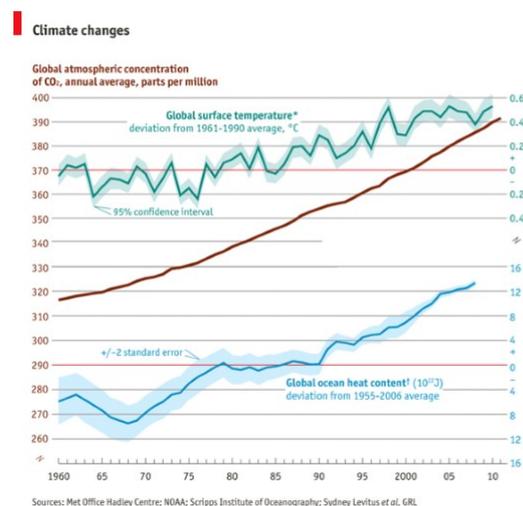
- Process for responding to climate change
- Climate change and variability
- Vulnerability of the wheat sector to climate change
- Adaptation – identifying and evaluating options to respond to climate change

## Process for responding to climate change in the Wheat Sector

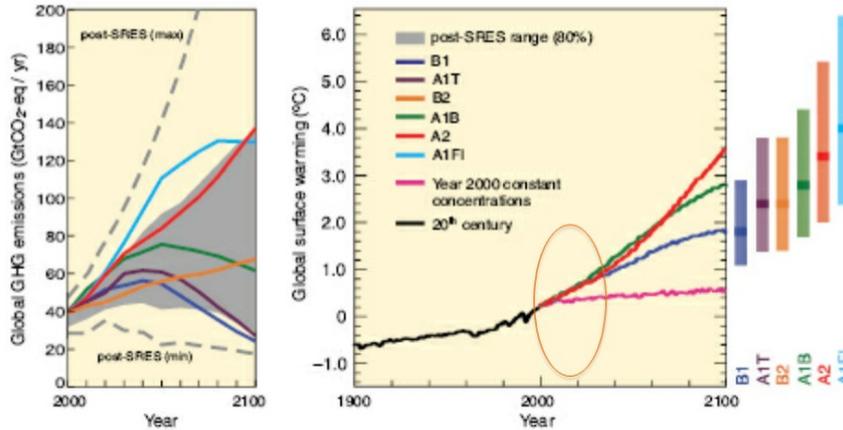
- Understand the expected changes in climate
- Assess the impacts of climate change on the wheat
- Identify options for reducing the impacts of climate

## Expected changes in climate

- Increased temperature
- Climate is already changing
- The hottest years have all happened since the year 2000
- Globally, the last 18 months have set new records for average temperature



## Global temperatures will rise as greenhouse gas concentrations increase



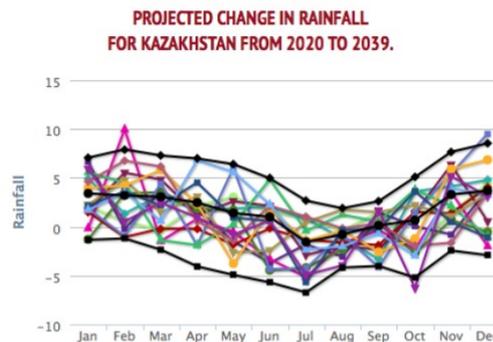
## Expected changes in climate

- Implications of increased temperature
  - Warmer winter, earlier start to spring
  - Hotter temperatures in the late spring and summer
  - More frequent periods of high temperatures, referred to as “heat extremes”

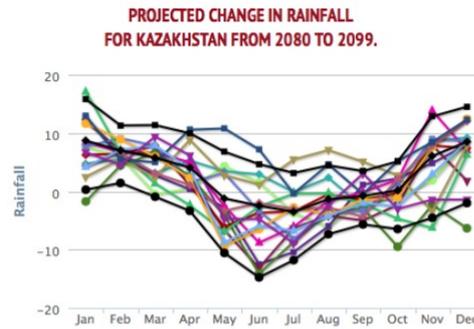
## Expected changes in climate

- Changes in precipitation
  - Increased annual precipitation
  - Changes in monthly and seasonal distribution of rainfall
  - More frequent droughts

- Between 2020 and 2039:
  - Annual rainfall will increase during the winter (November to March)
  - Rain in the summer months will decrease compared to historical rainfall patterns



- Between 2080 and 2099:
  - Even larger increases in winter rainfall are projected
  - Even larger decreases in summer rainfall are projected



## Climate Vulnerability

Definition: the extent to which something or someone is susceptible to harm due to climate change or variability

The term asset refers to things that are vulnerable to climate change. Assets include:

- People, households, businesses
- Water, soil, plants, trees, animals
- Roads, buildings, power and communications

## Climate Vulnerability

Climate vulnerability is a function of three factors:

**Exposure:** Is an asset in direct contact with climate?

- ↓ • People are vulnerable to high temperatures from a health perspective, at risk due to flooding
- Crops are vulnerable to droughts
- Roads are vulnerable to heavy rains and floods

↓ **Sensitivity:** Does exposure matter?

- While all people are vulnerable to high temperatures, the elderly are more sensitive to higher temperatures
- Some crops suffer greater losses because of heat or drought than other crops

11

## Climate Vulnerability

↑ **Adaptive Capacity:** Can you respond to vulnerability?

- Irrigation can minimize losses to drought as can good soil moisture management and cultivation practices
- Climate information can help farmers better prepare for variation in climate
- Crop insurance can help farmers avoid large losses

12

## Impacts of climate change on the wheat sector

- Soil
  - High temperatures and drought reduce soil moisture
  - Heavy rains result in higher rates of erosion, leaching of nitrates
  - On a larger scale, climate changes that reduce soil moisture, combined with poor soil management results in accelerated desertification
- Plants/crop yields
  - Warmer winter and spring temperatures can have positive impact on yields, but they also are favorable for insects and other pests that damage crops
  - Extreme high temperatures during flowering and maturing of plants reduces crop yields
- Farmers
  - Vulnerable to climate change, mainly because of annual variability in temperatures and rainfall
  - Low crop yields can reduce farm incomes and savings needed to replace equipment and machinery

## Adaptation

- Definition – Action taken to reduce vulnerability to climate change
- Adaptations can reduce exposure and/or sensitivity or increase adaptive capacity
- While most adaptations are designed to minimize damages due to climate change, there may also be opportunities to benefit from climate change
- Adaptation can be designed to reduce climate vulnerability in the near- and long-term

## Types of Adaptation

- Good practices
  - International transfer of new technologies
  - Improved farm-level decision-making (e.g., timing of planting, seed and crop selection, soil management)
- Capacity building
  - Increased awareness of climate variability and change
  - Education on improved practices
  - Research and development on temperature and drought-resistant varieties
- Infrastructure
  - Man-made or natural infrastructure
  - Includes weather monitoring and communication infrastructure
- Policy
  - Policies to support agricultural prices, discourage environmentally damaging land use management practices
  - Market incentives to encourage investment in new methods, technologies
  - Insurance schemes to protect farmers from large climate-related damages

15

## Criteria for evaluating adaptations

- Effectiveness in reducing vulnerability
- Costs of implementation including:
- Implementation issues:
  - How long will it take to implement
  - Is there adequate human resources (skills and staff levels)
  - Is there adequate financing available to support proposed adaptations

16



## **Climate Resilient Wheat Project Regional Workshop on Climate Change and Variability**



### **Small group exercise #1**

#### **Develop consensus on 5 top problems facing wheat producers in Kazakhstan**

Part 1: Introduction (10 minutes)

Part 2: Small Group Discussion (25 minutes)

- Participants discuss past and current problems and challenges facing wheat producers in Kazakhstan.
- Each small group should develop a consensus ranking of five problems and list on a flip chart.

Part 3: Plenary Discussion – Each group reports (10 minutes)

**Annual and multi-year decision-making at the farm level (45 minutes)**

Farmers make many decisions on an annual basis:

- What types of crops to plant
- How to rotate crops to protect nitrogen in the soil
- When to plant and harvest
- How to manage chemical inputs

On a multi-year basis additional decisions are made:

- How to manage soil resources and pests
- Types of cultivation practices
- Investments in equipment and machinery

**Annual and multi-year decision-making at the farm level (45 minutes)**

Small Group Discussion: Participants will consider various types of decisions in both the short- and long-term in the discussion.

Topic 1: Sources of information

Topic 2: Types of information used

Topic 3: Climate information and decision making

*Record notes from discussion on a flip chart.*

**Perceptions of changes in weather and impacts on wheat sector**

Part 1: Small Group Discussion (20 minutes)

How weather has changed (or is changing) and

How changes in weather have impacted the wheat sector

Record notes from discussion on flip chart

Part 2: Report to Plenary (10 minutes)

*Focus on the most significant changes in weather and their associated impacts to the sector*

**Options for reducing vulnerability**

Part 1: Discuss Vulnerability (5 minutes)

Part 2: Identify Adaptation Measures for Vulnerable Assets (15 minutes)

Identify 2 vulnerable assets

For each vulnerable asset, identify two or more adaptation measures that reduce vulnerability to the relevant climate change impact

For each option, indicate whether the measure reduces exposure, reduces sensitivity, or increases adaptive capacity

Record your answers on a flip chart

Part 3: Report to Plenary (10 minutes)

*Focus on some of the most relevant, innovative, and/or popular adaptation measures that were mentioned by your group*

## Adaptation Game

Adapted from the Red Cross / Red Crescent  
Paying for Predictions Game

### Context

In this game:

- You are an individual wheat farmer
- You have a relationship with other wheat farmers in the region (represented by groups of three)
- Your region is prone to droughts
- You are going to make farming-related decisions in the face of uncertainty
- You will play a set number of rounds, where a round represents a year
- You have finite resources (i.e., coins) that you want to maximize

### Group

- 1 die – represents regional rainfall
- 1 red cup – represents regional uncertainty in rainfall

### Individual Farmer

- 8 coins – represents resources in your savings
- 1 die – represents local rainfall
- 1 worksheet – record your results

- In each round you will roll both the regional and local die.
- If the sum of the regional and local dice is equal to or greater than 10, you will experience a DROUGHT!
- When you experience a drought your harvest will not be profitable so you will need to dip into your savings to pay for seeds to plant in the next year.
- The more severe the drought the more you will need to take from your savings.
  - 10 = minimal drought = 3 coins
  - 11 = medium drought = 4 coins
  - 12 = severe drought = 5 coins
- If the sum of both dice is less than 10, you do not experience a drought, so you don't need to pay.

- The moderator will also roll a die every round. This die represents market prices.
- If the moderator rolls a 1 or 2 in a round the annual market prices are high for wheat and you will receive another coin to put in your savings.
- This is only relevant for those that did not experience a drought (rolled less than 10).

- You can choose to prepare for the drought by purchasing drought resistant seeds, which are more expensive.
- You will need to use 1 coin from your saving to pay for the seeds.
- You will pay after you roll the regional die if you would like to prepare for droughts.
  - You will be able to make this decision in each round
- If you chose to prepare, you do not need to pay anything if you experience drought (even if the sum of the dice is greater than 10).

- Roll the regional die under the cup
- Pay 1 coin if you want to prepare
- Roll the local die
- What are the results!

	2	3	4	5	6	7	8	9	10	11	12
Prepared	1	1	1	1	1	1	1	1	1	1	1
Not prepared	6	0	0	0	0	0	0	0	3	4	5

"Act in Vain" (dice 2-9)  
 "Worthy Action" (dice 10-12)  
 "Worthy Inaction" (dice 2-9)  
 "Fail to Act" (dice 10-12)

Location of Workshop: \_\_\_\_\_

Round	Regional Die	Prepared	Local Die	Total Dice	Outcome	Cost of Drought	Payment from Market Prices	Number of Coins Remaining
Practice		Y			No Disaster		Y	
		N			Drought		N	
		Y			No Disaster		Y	
		N			Drought		N	
		Y			No Disaster		Y	
		N			Drought		N	
		Y			No Disaster		Y	
		N			Drought		N	

- If a player encounters a drought and they don't have enough coins to purchase seeds for the following year, then that player gives up all their coins and receives a penalty: *bankruptcy*.
- The player continues to play but every time they encounter drought they accumulate another bankruptcy

- This game has two different winners:
  - Individual winner – person with the most beans
  - Team winner – team with fewest bankruptcies (or largest pooled savings)

**Let's Play!**

- *Wait* - Wouldn't it be helpful to know the result of the regional rainfall die before deciding whether to pay 1 coin for preparedness?
- This would be like having a forecast.
- Each group will have the chance to bid on the forecast. If you win the bid, you'll be able to see the regional die before making a decision on preparedness for the whole game!
- Discuss the bid with your teams and have each individual contribute what they are willing.
- The 4 teams with the highest number of coins in their bid will receive the forecast.

Total Value of Dice	Outcome	Cost of Drought if not prepared
2	No disaster	0 coins
3	No disaster	0 coins
4	No disaster	0 coins
5	No disaster	0 coins
6	No disaster	0 coins
7	No disaster	0 coins
8	No disaster	0 coins
9	No disaster	0 coins
10	Minimal drought	3 coins
11	Medium drought	4 coins
12	Severe drought	5 coins

- Now, you have the option of purchasing insurance for the rest of the game (i.e., coverage for the next four years).
- If you have insurance, the number of coins that you have to withdraw from savings are reduced by 2 in each round where you experience drought.
  - E.g., if you roll a 10 and you did not prepare, you only need to pay 2 beans
- We will go through the same group bidding process for insurance.
- *Except* only the 2 highest bidding teams will receive an insurance policy.

Total Value of Dice	Outcome	Cost if not prepared	Cost if not prepared w/ insurance
2	No disaster	0 coins	0 coins
3	No disaster	0 coins	0 coins
4	No disaster	0 coins	0 coins
5	No disaster	0 coins	0 coins
6	No disaster	0 coins	0 coins
7	No disaster	0 coins	0 coins
8	No disaster	0 coins	0 coins
9	No disaster	0 coins	0 coins
<b>10</b>	<b>Minimal drought</b>	<b>3 coins</b>	<b>1 coins</b>
<b>11</b>	<b>Medium drought</b>	<b>4 coins</b>	<b>2 coins</b>
<b>12</b>	<b>Severe drought</b>	<b>5 coins</b>	<b>3 coins</b>

- Climate change is likely to change the likelihood and magnitude of extreme events, such as droughts, from historical trends experienced in the past.
- We will replace the 6-sided die with an 8-sided die to represent increased regional climate variability.
- The cost of drought with climate change is now:
  - 10 = minimal drought = 3 beans
  - 11 = medium drought = 4 beans
  - 12 = severe drought = 5 beans
  - 13 = catastrophic drought = 6 beans
  - 14 = the most catastrophic drought = 7 beans

Total Value of Dice	Outcome	Cost if not prepared	Cost if not prepared w/ insurance
2	No disaster	0 coins	0 coins
3	No disaster	0 coins	0 coins
4	No disaster	0 coins	0 coins
5	No disaster	0 coins	0 coins
6	No disaster	0 coins	0 coins
7	No disaster	0 coins	0 coins
8	No disaster	0 coins	0 coins
9	No disaster	0 coins	0 coins
10	<b>Minimal drought</b>	<b>3 coins</b>	<b>1 coins</b>
11	<b>Medium drought</b>	<b>4 coins</b>	<b>2 coins</b>
12	<b>Severe drought</b>	<b>5 coins</b>	<b>3 coins</b>
13	<b>Catastrophic drought</b>	<b>6 coins</b>	<b>4 coins</b>
14	<b>Extreme catastrophic drought</b>	<b>7 coins</b>	<b>5 coins</b>

- Climate change is projected to increase climate-related variability in the future
  - E.g., extreme events, such as droughts, are likely to occur at higher magnitudes and more frequently
- These changes in climate will have wide-reaching impacts on many aspects of society, including farming
- Although tools, such as seasonal forecasts, can help to better understand seasonal variability there is still an inherent uncertainty in weather
- Luckily, there are a number of options for managing climate-related risks
  - E.g., this game highlighted the use of insurance and drought resistant seeds





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