Monitoring and Surveillance of Cereals Pests, Diseases and Weeds

Report from Central Asia 2012

Sub-regional Office of FAO for Central Asia (FAO-SEC)

December, 2012

CONTENTS

Abbreviations

CIMMYT	International Maize and Wheat Improvement Centre
FAO	Food and Agricultural Organization of the United Nations
FAO-SEC	FAO Sub-regional Office for Central Asia
ICARDA	International Centre for Agricultural Research in the Dry Areas
IWWIP	International Winter Wheat Improvement Program
KazSRIF	Kazakh Scientific Research Institute of Farming
KSRIF	Kyrgyz Scientific Research Institute of Farming
NK	North Kazakhstan
SibRIA	Siberia Research Institute of Agriculture
TFI	Tajik Farming Institute under the Tajik Academy of Agricultural Sciences

1. Introduction

1.1. Background

Bread remains main staple food for the people of Central Asia and theregion has the highest rate of wheat consumption per capita, or in other words the share of wheat and wheat products in people's diet in average is the highest in the world – more than 200 kg per year (FAOSTAT). Thus, the cereal crops are highly contributing and significantly important for the food security of the region.

Production and supply levels in the countries of the region are not equal. Kazakhstan is among the top wheat exporters, however countries like Tajikistan and Kyrgyzstan are highly dependent on the import of wheat products, including grain and flour. Wheat production in the region is facing many challenges, among them significant spread of diseases and pests which is critical to the economy. In addition, the challenges include also weeds infestation and some main abiotic factors such as drought, frost and salinity effecting grain production

Previous studies and surveys show that most dangerous foliar diseases of cereals for the region are rusts, as well as tan spot, powdery mildew and septoria. During the last 15 years, five epidemics of yellow rust occurred in the region, resulting in significant losses (Koyshibaev, 2000; Pett *et al.,* 2005; Hodson & Hovmeller, 2009).

It is known that races of rusts are changing continuously and becoming more virulent, wheat varieties become susceptible. Thus, in order to reduce damage of the diseases to the crop, timely monitoring and control of diseases to be carried out. Another group of diseases are so called seed-borne diseases, which are dangerous not only due to their effect to the yield and their dissemination by seed, also they can be the reason of downgrading the grain and seed quality. Such diseases include loose smut, common bunt and black point.

Sub-regional Office of FAO for Central Asia (FAO-SEC[1]) in close collaboration with IWWIP of CIMMYT and ICARDA and National Consultants on Cereal Pathology provided assistance to national programmes in conducting field surveys of cereal pests, diseases and weeds in five countries of the region, including Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan in 2012. For conducting monitoring and surveillance, the strong team of national consultants - experienced specialists on cereal pathology, as well as young specialists - were involved. This report is prepared by Bahromiddin Husenov. The report reflects the main findings of conducted survey and monitoring. The report was presented and discussed during the Central Asia and Caucasus Regional Expert Consultation on monitoring of cereals diseases, pests, weeds and cereals disease resistance breeding, held in Almaty, Kazakhstan on 27-28 February 2013.

[1]FAO-SEC office covers Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, Azerbaijan and Turkey

The main objective of the field surveillance was collecting information on the spread and occurrence of the main diseases, pests and weeds, as well as crop management practices. Furthermore, resistance level of currently grown varieties and breeding lines towards the major diseases were noted. Where the rusts diseases were observed, reaction of the grown varieties were recorded and samples were taken for pathotype identification. Seed samples of released wheat varieties from each country were collected for screening against the important diseases under the natural and artificial conditions of Kenya and Turkey.

1.2. General information about Central Asia

In all countries of the region, agriculture is considered as an important economic sector. While in Uzbekistan and Tajikistan its share is more than 20% in the national GDP, this figure is lower in oil-rich countries like Azerbaijan and Kazakhstan - 8.7 and 10.3% respectively.

Figure 1. Map of Central Asia

Distribution of arable land also varies from country to country. For instance. in Kazakhstan with its largest area in the region, the area of arable land per capita makes 1.42 ha. The mountainous country Tajikistan has the least area of arable land per capita - 0.08 ha per capita (Table 1).

In all countries agriculture reforms brought up new farming systems, which replaced the Soviet farming system. Presently, collective farms, production cooperatives and family farms as well as other types of private farming systems are active in the sector.

Table 1. Countries profile

Country	Area, sq. km	Population, 000	Arable land, total, 000 ha	Arable land per capita, ha	Share of agriculture in GDP, %
Azerbaijan	86,600	9,200	1,600	0.17	8.7
Kazakhstan	2,724,900	16,878	24,033	1.42	10.3
Kyrgyzstan	199,900	5,551	1,344	0.24	18.5
Tajikistan	142,600	7,800	600	0.08	21
Uzbekistan	447,400	29,560	4,400	0.14	24

Agriculture of Azerbaijan is mainly based on production of cereals, fruits, vegetables and livestock husbandry. The area of arable land in the country is 1.6 mln. ha out of which 1.1 mln. ha are irrigated. Wheat is the most important and widely grown cereal crop in Azerbaijan, which grown on the 70% of the total area under cereals. During the 2011-2012 growing season, the total area occupied by cereals made 995,900 ha.

In 2012, the cereals in Kyrgyzstan were grown on area of 633,000 ha. Area under wheat made 460,000 ha and under barley was 93,800 ha.

Uzbekistan is the most densely populated country in the region. Its population makes about 30 mln. Agriculture involves 28% of labour. The share of agriculture in national GDP is 24%. Because of its importance as a staple crop for the national food security, Government of Uzbekistan pays special attention to wheat crop. Other cereals such as barley and rye are grown mainly in the rainfed areas. During the recent years the area under wheat was expanded in the irrigated lands replacing cotton. Currently wheat is grown on area of 1.3 mln. ha, 89 percent of which is irrigated. Gross grain production reaches 6.5 mln. ton and by the average yield Uzbekistan is leading in the region (4.74 t/ha). Farmers observe all recommendations: only certified seed is allowed for planting and almost all fields are sprayed with pesticides. Share of Uzbekistan in overall grain production in the region in 2010 made 35 percent, which makes it the second largest producer after Kazakhstan (Table 2; Figure 2).

Table 2. Wheat production in Central Asian countries (FAOSTAT, 2010)

	Area		Production		
Country	**Harvested, ha**	**Share, %**	**Ton**	**Share, %**	**Yield, t/ha**
Azerbaijan	656,480	4.12	1,272,340	6.59	1.94
Kazakhstan	13,138,000	82.46	9,638,400	49.90	0.73
Kyrgyzstan	375,000	2.35	813,300	4.21	2.17
Tajikistan	342,566	2.15	857,545	4.44	2.50
Uzbekistan	1,420,000	8.91	6,730,400	34.85	4.74
Total	***15,932,046***	***100***	***19,311,985***	***100***	***1.21***

Agriculture in Tajikistan makes 21 percent of national GDP and involves more than 50 percent of labour forces. Main agricultural products are cotton, cereals, fruits and vegetables.

Wheat is the main staple food crop grown annually on 300,000-350,000 ha. Current production of wheat covers only 60 percent of the country's need which is highly wheat-import dependent. According to the country's State Agency for Statistics, 90 percent of imported wheat products are from Kazakhstan and about 10 percent are from Russia.

Kazakhstan has the largest wheat production: the total area under wheat makes 13-14 mln. ha as 82,4% of total area under wheat in the region. Besides, Kazakhstan is the main wheat producer with overall production of 9.6 mln. tons.

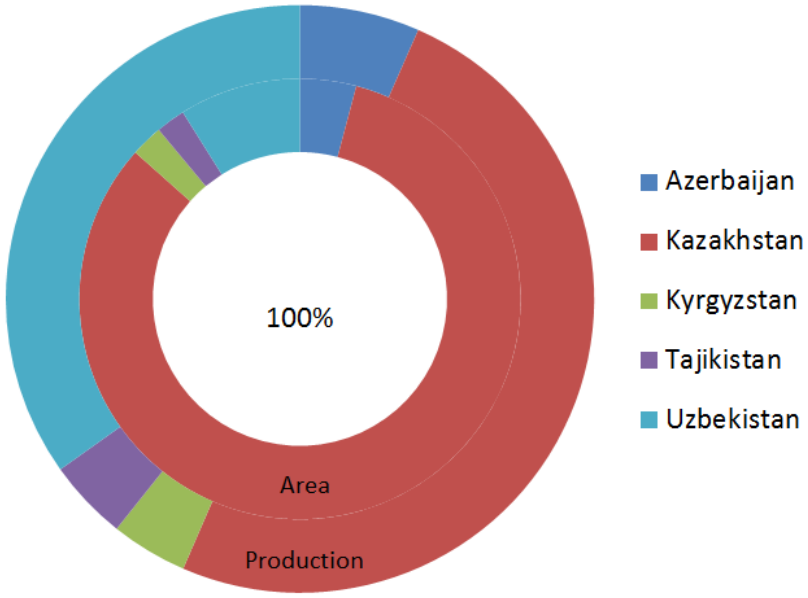

Figure 2. Regional share of harvested area by countries and overall production of wheat (FAOSTAT, 2010)

2. Field Surveillance

2.1. Methodology

2.1.1. Routing and fields

The survey routing included main areas where cereals are grown. Considering the importance of wheat, the survey mostly covered the fields under the wheat crop.

2.1.2. Field survey form

Field survey form consisted of three main parts (Annex 1): (i) General Information about a Farm; (ii) Field and crop management information, and (iii) Surveillance of the main diseases and pests.

General information included the address, ownership and contacts of a farm, cereals grown in the farm were also recorded. The Field and crop management part included the overall information about field, its location (GPS data), the purpose of cultivating. In addition, this

part included the management practices such as irrigation types and rate, diseases and pest control and weed management.

The third part included the overview of the crop, weeds spread and most predominant weed species, main foliar and seed-borne diseases, insect pest and other constraints, affecting growth and yield of cereals.

2.1.3. Disease and pest assessment

Surveyors have assessed the rust and other foliar diseases by incidence and severity and noted the reaction of the variety against the diseases. Diseases severity assessment was based on the modified Cobb scale (Peterson *et al.*, 1948) and the host response to infection by rusts was assessed according to Roelfs *et al.* (1992).

- Incidence and severity: low (<20%), moderate (20-40%), high (40%<)
- Reaction of the variety to the diseases: R (resistant), MR (moderately resistant), MS (moderately susceptible), MSS (moderately susceptible to susceptible) and S (susceptible).

The following formula has been used to calculate the percentage of the infection for diseases:

$$\text{Disease, } \% = \frac{\textit{Number of Infected Plants}}{100\,(\textit{Selected Plants in 1m2})}\,\boldsymbol{x100}$$

In the fields where the seed-borne diseases were found in less than 1 plant per 1000 sq. m, they were rated as very low. If the incidence was higher, several observation samples consisting 100 plants were randomly inspected. Among the inspected plants the infected ones were counted to calculate the percentage of infection.

Main species of pests damaging the crops have been recorded. Also their natural enemies – beneficial insects were recorded. The insects' damage level has been rated low for less than 20%, rated medium for 20-40% and rated high when the damage was more than 40%.

The same rating method was used for scoring weed species that were predominant. The density of weeds species per sq. m with less than 20% was noted as low, from 20 to 40% – as medium and when the density was more than 40% weeds have been recorded as highly spread in the field.

2.2. Overall results of monitoring and surveillance

Overall results of the monitoring and surveillance of cereals pests, diseases and weeds are presented in table 3.

Table 3. Overall results of the disease and pest surveillance in the wheat fields, 2012

Constraint	Azerbaijan	Kazakhstan: *Akmola*	Kazakhstan: *Kostanay and North Kazakhstan*	Kyrgyzstan	Tajikistan	Uzbekistan
Diseases						
Yellow rust (*Puccinia striiformis*)	No	Low	No	No	Low	Low
Leaf Rust (*P. recondita*)	No	Low	No	Low	Low	No
Stem rust (*P. graminis*)	No	Low	No	No	Low	No
Septoria (*Septoria tritici*)	No	Medium	Low	No	Low	Low
Tan spot (*Pyrenophora tritici-repentis*)	No	Low	Low	Low	Medium	Low
Powdery mildew (*Blumeria graminis*)	No	No	No	No	Low	No
Common bunt (*Tilletia laevis*)	No	No	No	No	Medium	No
Loose smut (*Ustilago tritici*)	No	No	No	No	Low	No
Pests						
Sunn pest (*Eurygaster integriceps*)	No	No	No	Low	Medium	Low
Aphids (*Schizaphis graminum; Diuraphis noxia*)	Low	No	No	Low	Medium	Medium
Cereal leaf beetle (*Oulema melanopus*)	Low	No	Low	Low	Medium	Low
Sawfly (*Cephus cinctus*)	Medium	No	No	No	Medium	No
Barley flea beetle (*Phyllotreta vittula*)	No	Low	No	No	No	No
Others	Low	Low	Low	Low	Low	Low
Weeds						
Avena fatua	Low	Low	No	Medium	High	No
Convolvulus arv.	No	Low	No	Medium	High	No
Gallium appar	No	No	No	No	Medium	No
Lolium mult.	No	No	No	No	Medium	No
Sinapis arven	Low	No	No	Low	Medium	No
Chenopodium album	No	No	No	Low	Low	No
Vicia spp.	No	No	No	No	Low	No
Others	Low	Low	Low	Low	low	No
Abiotic stresses						
Heat	Medium	No	No	No	Low	No
Drought	Medium	No	No	low	Low	Low
Nutrient deficiency	No	No	No	No	Low	No
Frost	No	No	No	No	Low	Low

2.2.1. Main diseases

In 2012 due to weather and climatic conditions, rust and major foliar diseases were not widely spread over in all countries of the region. Observations show only few cases with a low incidence of yellow rust and stem rust. In some places the incidence of leaf rust was observed. Although the leaf rust was observed more often, there was no significant spread and damage due to the late disease appearance in the season. Seed-borne diseases were more common in Tajikistan compared to other countries. Its main reason could be that treating seed with fungicides is not widely practiced in Tajikistan like in other countries.

2.2.2. Main insect pests

It was found out that most spread insects in the region are Sunn pest, aphids, cereal leaf beetle, sawfly and barley flea beetle. Other insects such as trips, life minor and locust have been rarely recorded in the countries.

Figure 3. Wheat crop infected by sawfly and weeds, Muminabad, Tajikistan

2.2.3. Weeds

Weeds are an additional serious concern for the growers (Fig. 4). According to the survey results, one can conclude that most spread weed species in the cereal fields of the region are

Avena fatua and *Convolvulus arvensis*. In addition, other species such as *Gallium aparena, Sinapis arvenisis, Chenopodium album* etc. were recorded, but at low level.

Figure 4. Wheat field with high weed density, Bokhtar, Tajikistan

2.2.4. Abiotic stresses

The survey showed that drought and heat are highly observed abiotic stresses. Affecting growth and yield of cereals, for example in Azerbaijan, almost half of the fields were under drought affect while half of it under heat affect. Many drought affected fields of wheat were also observed in Tajikistan.

2.3. Results of monitoring and surveillance by countries

2.3.1. Azerbaijan

In Azerbaijan fifty two fields over 27 farms throughout 16 districts have been surveyed (Fig.5) Main survey items were bread wheat (41 fields), barley (9 fields) and durum wheat (2 fields). Surveys were conducted in May 2012; when plants were in a stage from middle of the flowering to dough stage. Almost half of fields was on irrigated land and other half on the rainfed area. Some surveyed fields were cultivated for seed production, while majority were sown for grain production.

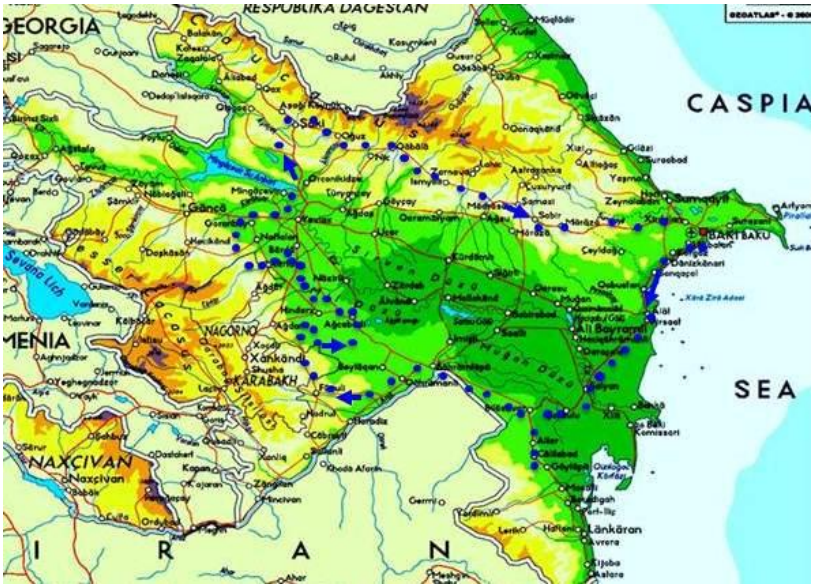

Figure 5. Survey route in Azerbaijan

Pests and diseases usually pose significant harm to cereals in Azerbaijan. One of the main diseases is yellow rust whose outbreaks were recorded in previous wet years. However, in 2012, no serious diseases were observed, most probably because of the severe winter and dry spring that is unfavourable weather conditions for fungi.

Majority of cereal crops on the irrigated fields suffered from heat, while many on the rainfed fields suffered from drought and heat.

There are many fields with low to moderate damage levels where pest insects, which were not so widespread during the previous years, were observed. Among them were sawfly, cereal leaf beetle and aphids were most spread. It should be mentioned that especially sawfly impacted most serious damage to the crops. The symptom of the damaged by sawfly, as drying ear, was observed everywhere. This fact raised the concern and requires taking concrete control measures against this pest.

Predominant observed weed species in Azerbaijan were *Avena fatua, Vicia spp., Sinapis arvensis* etc.

The observation showed that cereal crops in the small-scale farms are relatively in the poor conditions than those in the bigger farms. Small scale farms don't follow good crop management practices; no proper crop rotation, no pesticide control and only few of them use complex fertilisers.

2.3.2. Kazakhstan

In Kazakhstan, three main wheat growing regions Akmola, Kostanay and North Kazakhstan were surveyed. The collected information showed no cereal rusts during the dry climatic conditions of May and June in the fields of South-East of Kazakhstan. The diseases were

found in the breeding trials only. With a relatively moderate incidence, not exceeding 20-40%, tan spot was observed in the area.

- *Akmola region*

More than 30 fields of spring wheat were surveyed across the Akmola region. Leaf rust and stem rust were observed during the dough stage with a very low incidence. During the survey, the low incidence of septoria diseases (*Septoria nodorum, Septoria tritici*) in spring wheat were observed. Incidence of septoria diseases were 5-30%. In most cases, lower leaves were damaged. Most probably the spreading reason of diseases is virulence of the pathotypes as well as lower level of resistance in grown varieties. Tan spot in wheat and spot blotch in barley were also observed.

Weeds density prevalence was low. *Avena fatua, Artemesia absinthium, Euphorbia pepelus, and Convolvulus arvensis* were weed species, which were predominantly observed. Only one of the surveyed farms in Bulandin district had high density of weeds.

Main observed insects included barley flea beetle (*Phyllotreta vittula*) with a severity from 0 to 25%. Locusts were observed in cereal fields of the Sandyktau, Schuchina, Bulandin and Ermentausk rayons,which did not have a significant impact on the plants.

- *Kostanay and Northern Kazakhstan Regions*

Both regions make almost 60% of the total grain production. Spring wheat makes more than 90% of all cereals area in Kostanay region, while barley makes 6% and the rest are other cereals. In Northern Kazakhstan region, barley consists about 13% of all cereals, while spring wheat is 85%. Compared to the Northern regions, wheat is grown in less area in Almaty region, where its share is 52% of the cereals of the region.

No rusts were observed in production field; only in the breeding trials diseases were found. Low level of tan spot and septoria were observed. Because of the seed treatment, smuts and bunts are not a big problem in the region.

The herbicides usage helped to control weeds. The most frequently observed weeds were *Convolvulus arvensis and Avena fatua*.

No high damage by insects were seen, occasionally trips, aphids and sawfly were recorded.

2.3.3. Kyrgyzstan

Wheat fields as well as other cereal crops in most growing areas were surveyed during May and June (Figure 6). In most surveyed fields, plants were in milk and dough stage.

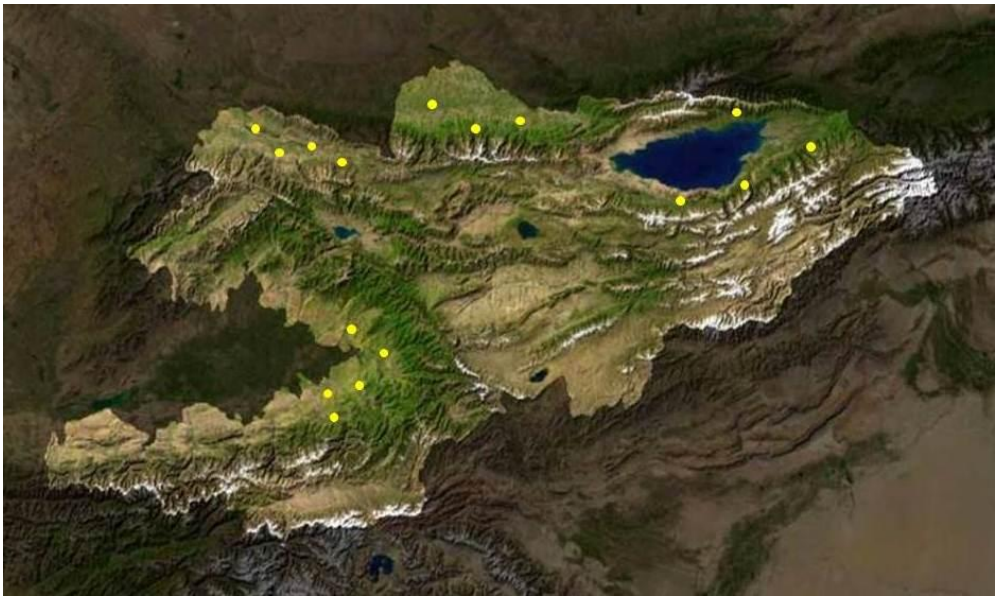

Figure 6. Survey and monitoring route in Kyrgyzstan

Among the rust diseases of cereals only leaf rust with very low incidence was occasionally observed in the southern districts only. Other observed foliar diseases were tan spot, septoria leaf blotch and powdery mildew with only low incidence.

Predominant weed species were *Convolvulus arv., Avena fatua, Chenopodium album, Scirpus and etc.*

Sunn pest was recorded at low level in wheat fields. Occasionally cereal leaf beetle, trips and aphids were also found in the cereal crops.

During the survey the cereal crops were found out, impacted by the drought, to various extents.

2.3.4. Tajikistan

In Tajikistan mainly wheat fields were surveyed. Also monitoring was conducted on diseases, pests and weeds in barley, rye and triticale fields (Figure 7).

Like in other countries, rust diseases with a very low incidence were observed only in few fields in Tajikistan. Yellow rust with a low incidence in seven fields of wheat and in one barley field was recorded. Leaf rust with a low incidence was seen in eleven wheat fields. Stem rust was observed only in one location in a few plants, in Baljuvon district. However, yellow rust and leaf rust in some breeding lines were found at higher level (Figure 8).

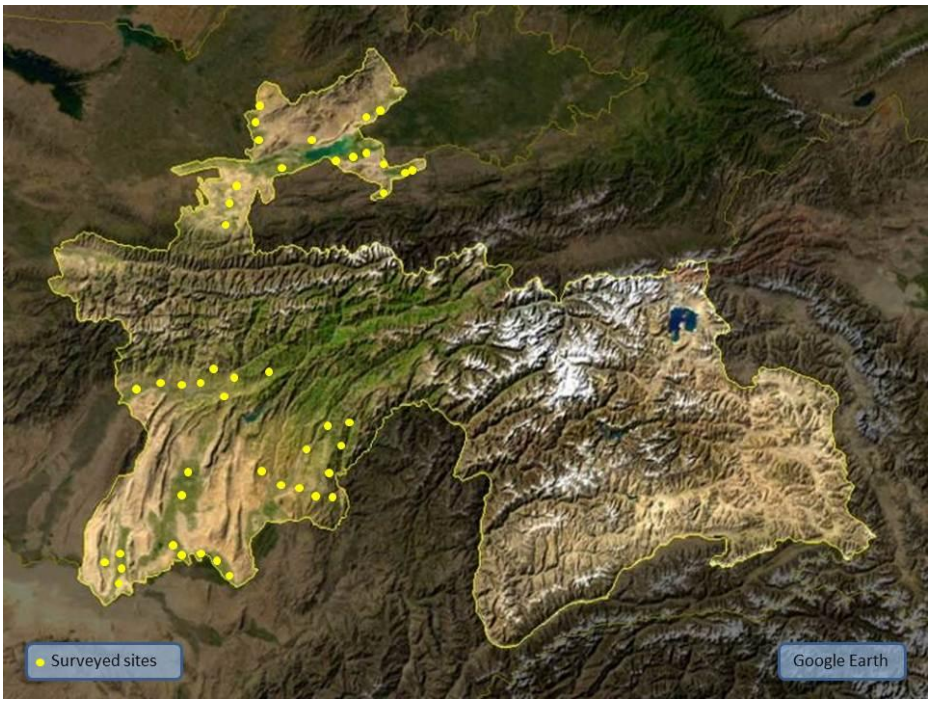

Figure 7. Survey route in Tajikistan

Other observed foliar diseases were powdery mildew, tan spot, septoria leaf blotch and spot blotch in barley.

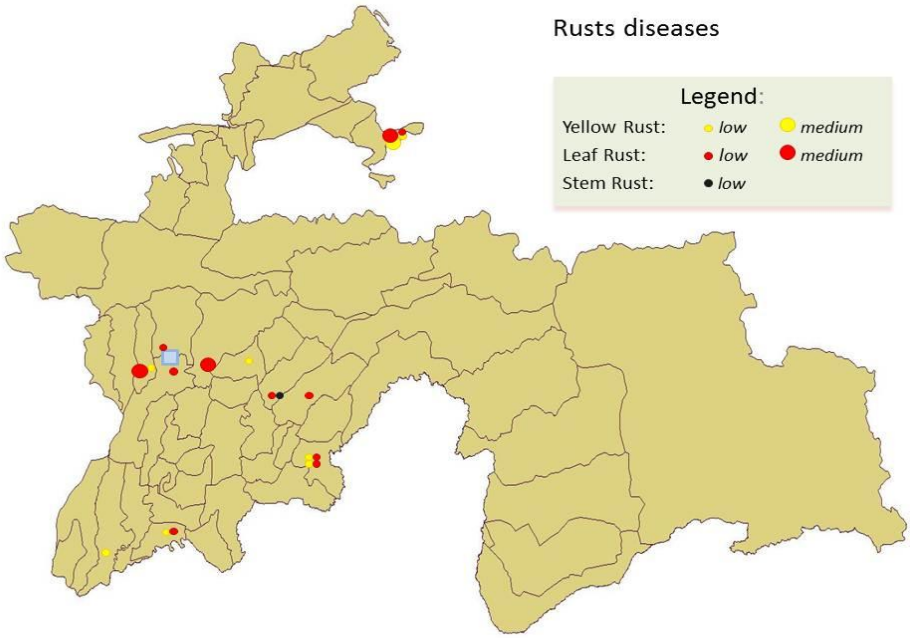

Figure 8. Rusts incidence in cereal crops in Tajikistan

Regarding to seed-borne diseases, the highest incidence of common bunt (10%) was found in South of Tajikistan. Loose smut (both in wheat and barley) and covered smut of barley were found occasionally.

Most spread insect pests: Aphids (*Schizaphis graminum*, *Diuraphis noxia*), sawfly (*Cephus cinctus*), Sunn pest (*Eurygaster integriceps*), and Cereal leaf beetle (*Oulema melanopus*).

Predominant weed species were *Convolvulus arvensis*, *Avena fatua*, *Gallium apparane*, *Sinapis arvensis*, *Vicia spp.*, *Lolium multiflorum.*

Common abiotic stresses in Tajikistan were drought, microelements deficiency and salinity.

2.3.5. Uzbekistan

Due to the early frosts in the fall 2011, many farmers were not able to plant winter cereals in time. In spring, climatic conditions were favourable for growth of the planted crops and there was no disease and pest pressure that contributed to high production of grain.

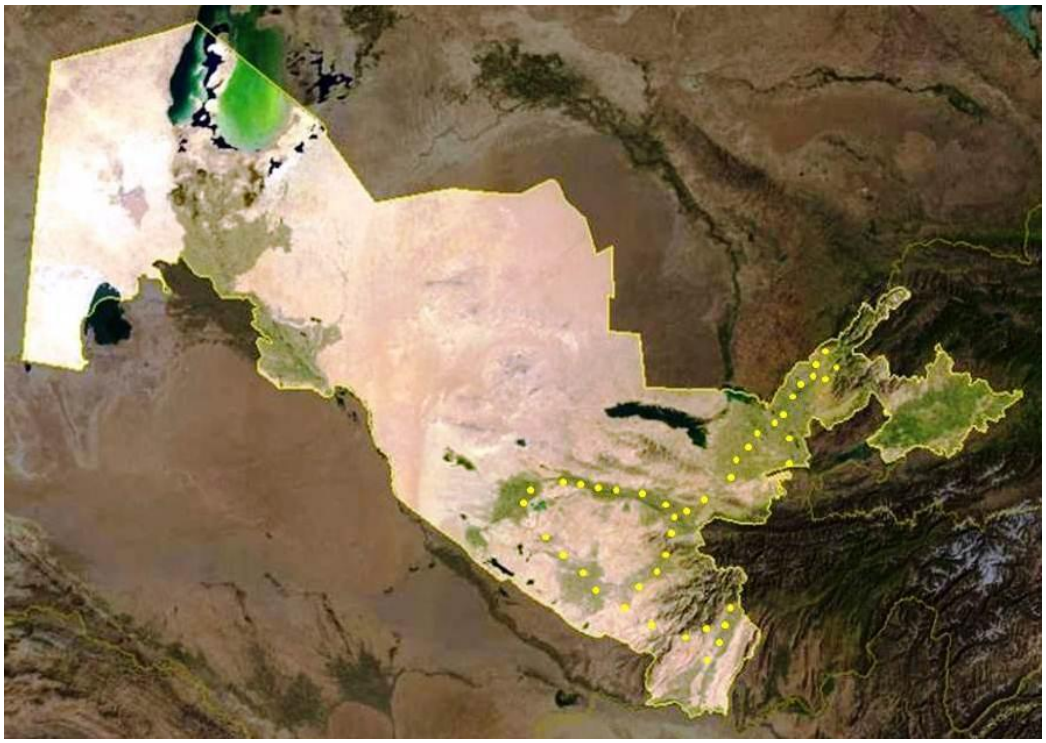

Figure 9. Survey route of survey in Uzbekistan

Yellow rust was rarely seen in Uzbekistan in 2012. Yellow rust was observed only in one surveyed field in Surkhandarya region. Besides, the disease was also observed in a very susceptible variety “Morocco” in two experimental trials.

Later in the season leaf rust appeared in many places. As wheat plants were close to maturity stage, it is obvious that impact of the diseases on the production was not significant.

In many surveyed fields, low level of tan spot and septoria was observed. In many surveyed fields of Bulungur district in Samarkand region, high spread of *Septoria tritici* was recorded. It is not common and was recorded for the first time in Uzbekistan.

Because of the compulsory seed treatment, seed-borne diseases are not serious issue, thus common bunt and loose smut were not observed during the survey.

Because of the herbicide treatment and good crop management practices with rotation system weeds are also not serious issue for the country.

Mostly observed insect pest was Sunn pest, cereal leaf beetle and Russian wheat aphid. High spread of Russian wheat aphid was observed in some fields of Bukhara and Surkhandarya regions. Slight increase of Sunn pest and cereal leaf beetle was observed compared to the previous years.

2.4. Wheat varieties and seed samples

2.4.1. Major wheat varieties in the region

- *Azerbaijan*

Main grown varieties of wheat in Azerbaijan are *Azamatly-95, Bezostaya 1, Aran, Gobustan, and Akinchi.* These varieties occupy almost 65% of all wheat area. From the previous studies on their performance towards the resistance to rust diseases, except *Aran* and *Gobustan*, which are moderately resistant to the rusts, the varieties grown in about 80% of whole wheat area are genetically susceptible.

- *Kazakhstan*

Main wheat varieties grown in Northern Kazakhstan are *Akmola 2, Astana, Tselina 50, Shortandynskaya, Omskaya 18, Omskaya 35 & 36.*

In overall more than 30 varieties of wheat are grown in the Northern regions of Kazakhstan. Mostly bread wheat dominates while durum wheat is grown only in less than 4% of the area.

In Kostanay region mostly grown varieties of wheat are bread in SibRIA: *Omskaya 18 (19.8%), Omskaya 36 (19.9%), Omsakay 29 (12.3%), Svetlanka (10.6%).*

In Northern Kazakhstan Region most varieties of bread wheat are bred by Scientific Centre of Grain named after Baraev followed by varieties of SibRIA: *Astana (18.3%), Omskaya 19 (14.8%), Pamyat Azieva (10.8%) Omskaya 35 and 36 (8.5 and 8.6% respectively).*

In South-Eastern regions of the country predominant winter wheat varieties are bred by KazSRIF: *Steklovidnaya 24 (44.4%), Almali (11.8%). Variety Bezostaya 1* is grown on area of about 37%. The area under spring wheat is about 20% and the main spring varieties are *Kazakhstanskaya 10 and Kazakhstanskaya 4.*

- *Kyrgyzstan*

Currently 35 varieties of wheat are released in the country. Widely grown wheat varieties are *Krasnodar-99, Intensivnaya, Zubkov, Umanka and Starshina* (Annex 2).

- *Tajikistan*

Currently in the National Variety List, 12 varieties of bread wheat and three varieties of durum wheat are listed for commercial use in Tajikistan (Annex 2). However, most widely grown varieties of bread wheat are *Krasnodar-99 (19.3%), Basribey (17.6%), Starshina (8.1%), Lastochka (7.4%) and Steklovidnaya-24 (4.5%).* Thus, majority of grown varieties in the country are not in the National Variety List (Source: SCVT, 2012).

- *Uzbekistan*

Most widely cultivated wheat varieties are *Krasnodar-99, Tanya, Moskvich, Kroshka,* which are bred in Krasnodar Institute of Agriculture named after Lukyanenko. Variety *Dustlik* is selected from the breeding lines promoted by IWWIP (Annex 2.4).

2.4.2. Seed sample collection for disease test

Seed of most grown varieties as well as perspective breeding lines were collected for screening against the main diseases (Annex 2). These seeds will be put into special trials for testing in hot spots and/or under the artificial conditions: for yellow rust, leaf rust, common bunt, tan spot and septoria in Turkey during the growing season 2013-2014 and against the new race of stem rust pathotype *Ug99* in Kenya during the summer 2013.

3. Concluding remarks

Based on the survey results it can be concluded that cereal crops in the region are affected by a number of biotic stresses like diseases, pests and weeds as well as abiotic stresses – drought and high temperature. Climatic condition during the growing 2011-2012 season was not favourable for rusts and many other foliar diseases. In addition, damages by insect pests were significant, especially by Sunn pest, cereal leaf beetle and aphids.

During the survey it was revealed that there is a need for training of farmers on good practice of crop management and to improve access to high quality seed of desired varieties. It is necessary to continue breeding of new varieties that meet production and consumer's needs. Insect pest management as well as weed control should be seriously considered. It is obvious that knowledge on level of occurrence and spread of diseases, pests and weeds in cereal crops will allow to reduce losses. Timely actions to control diseases, pests, and weeds will allow to increase yield and overall grain production. In this regard, it is necessary to conduct surveys every year and gather information on the dynamics and spread of diseases, pests and weeds of the cereals in the region and to assess economic losses caused by diseases as well as resistance of widely grown and newly bred varieties to the major diseases.

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5. Annexes

Annex 1. Field Survey Form

Полевое обследование зерновых культур - 2012
в название страны

.....	.....	.....
День обсл-я (дд/мм/гг)	№ полевого обсл-я	ФИО обследователя

I. Общая информация о хозяйстве

1. Название хоз-ва: .....

2. Адрес: ..... (область/район) ..... (почтовый адрес)

3. Контактное лицо: ..... (ФИО) ..... (тел./факс/моб.)

4. Представитель хоз-ва: ..... (ФИО) ..... (моб./контакты) ..... (должность)

5. Зерновые в хозяйстве:

культура	сорт	площадь, га

II. Информация об обследуемом поле

6. Коорд.: Широта: С Ю ..... Долгота: В З ..... Высота (м): .....

7. Поле: ..... (культура) ..... (площадь (га)) ..... (предшественники) ..... (выращиваемый сорт)

8. Посев: ..... (дата) ..... (способ) ..... (протравка семян (дозы)) ..... (норма высева (кг/га))

9. Цель выр-я: зерно: ☐ корм: ☐ семян: ☐ репрод-я: .....

10. Уход

Удобрение: ..... (N, P, K) ..... (норма для каждого вида (кг/га, д.в.)) ..... (фаза применения)

Пестициды: ..... (инсект. фунгицид) ..... (доза (л,кг/га, д.в.)) ..... (фаза применения)

Сорняки: руч. прополка / хим. обработка / другое .....

Полив: орошаемый / богарный *Осадки:* ..... мм

..... (вид полива) ..... (даты первых и посл. полива) ..... (дата последнего полива/дождя)

III. Полевое обследование

11. Общий: ..... (вид поля) ..... (фаза развития) ..... (полегание)

12. Сорняки: ..... (густота (низкая, сред., высокая)) ..... (преобладающие виды)

13. Абиотич.: ..... (засуха) ..... (недостатка питательных элементов) ..... (другое)

14. Болезни: Пыльная головня: .....

Твердая головня: .....

Annex 1 cont.

Болезнь	Распространение в поле (**Н, С, В, Нет**)	Поражение (в пораж. раст-х) (**Н, С, В, Нет**)	Устойчивость (**У,УУ,УВ,УВВ,В**)
Желтая ржавчина			
Бурая ржавчина			
Стеблевая ржавч.			
Септориоз			
Жел.кор.пятнист.			
Мучнистая роса			

Поражение: **Н** (низкий)=менее 20%; **С** (средний)=20-40%; **В** (высокий)=более 40%

Устойчивость: **У** (устойчивый)=менее 10%; **УУ** (умеренно-устойчивый)=20-30%; **УВ** (умеренно-восприимч.)=30-40%; **УВВ** (ум. воспр.-воспр.)=40-50%; **В** (восприимчивый)=более 50%

Другие болезни: .....

(название и уровень поражения: **Н, С, В**) .....

15. Вредители: .....

вид и уровень поражения (**Н, С, В**)

16. Заметки: .....

Дополнительные сведения:

Необходимо уточнить приблизительную дату уборки урожая .....

Информировать фермера об отправке образцов семян с исследуемого поля

Послеуборочные сведения

Уборка ..... (дата) ..... (метод (вручную/комбайном))

Обработка зерна/семян ..... (очистка) ..... (калибровка)

Проверочный список

Собран образец желтой ржавчины:	ДА	НЕТ
Собран образец бурой ржавчины:	ДА	НЕТ
Собран образец стеблевой ржавчины:	ДА	НЕТ

Заметки: .....

! Незабудьте включить данную форму в общий список обследований

Annex 2.

2.1. List of wheat varieties and lines collected from Azerbaijan and submitted for disease resistance screening

#	Variety/line	Crop
1	Perzivan 1	Bread wheat
2	Azeri	Bread wheat
3	Taraggi	Bread wheat
4	Shaki 1	Bread wheat
5	Mirbashir 128	Bread wheat
6	Murov 2	Bread wheat
7	Gobustan	Bread wheat
8	Ruzi 84	Bread wheat
9	Aran	Bread wheat
10	Tale 38	Bread wheat
11	Azamatli 95	Bread wheat
12	Ugur	Bread wheat
13	Girmizi bugda	Bread wheat
14	Murov	Bread wheat
15	Shafag	Bread wheat
16	Yegana	Bread wheat
17	Zirva 80	Bread wheat
18	Fatima	Bread wheat
19	Gunashli	Bread wheat
20	Pirshahin 1	Bread wheat
21	Gizil bugda	Bread wheat
22	Shafag	Bread wheat
23	Nurlu 99	Bread wheat
24	Giymatli 2/17	Bread wheat
25	Agri/Nach//Kauz	Bread wheat
26	A4T SIR 5066	Bread wheat
27	A4T SIR 5061	Bread wheat
28	TT09214-7	Bread wheat
29	TT 09713	Bread wheat
30	TT96601	Bread wheat
31	Girmizi gul	Bread wheat
32	Kahraba	Durum wheat
33	Mirbashir 50	Durum wheat
34	Mugan	Durum wheat
35	Sharg	Durum wheat
36	Garagilchig 2	Durum wheat
37	Barakatli 95	Durum wheat
38	Turan	Durum wheat
39	Garabag	Durum wheat
40	Tartar	Durum wheat
41	Mirvari	Durum wheat

2.2. List of selected wheat varieties and lines in Tajikistan for disease resistance screening

#	Variety	Origin	Seed source	Year of release	Growth habit
1	Navruz	Tajikistan	Latif Murod	1982	F
2	Steklovidnaya 24	Kazakhstan	TFI	2002	W
3	Zafar	Tajikistan	TFI	2004	F
4	Alex	Tajikistan	Latif Murod	2007	W
5	Norman	Tajikistan	TFI	2007	F
6	Ormon	Tajikistan	TFI	2008	W
7	Somoni	Tajikistan	TFI	2008	S
8	Sadoqat	Tajikistan	Latif Murod	2011	F
9	Ziroat 70	Tajikistan	TFI	2009	W
10	Oriyon	Tajikistan	TFI		F
11	Sarvar	Tajikistan	Latif Murod		S
12	Yusufi	Tajikistan	Latif Murod		S
13	Vahdat	Tajikistan	Latif Murod		S
14	Isfara	Tajikistan	Latif Murod		S
15	Iqbol	Tajikistan	TFI		F
16	Shokiri	Tajikistan	TFI		F
17	Fayzbakhsh	Tajikistan	TFI		F
18	Krasnodar 99	Russia	Latif Murod		W
19	Basirbey	Turkey	Latif Murod		F
20	Starshina	Russia	Mukarramov		W
21	Lastochka	Russia	Latif Murod		F
22	Jagger	USA	Hamadoni		W
23	Irishka	Russia	Latif Murod		W
24	Yesaul	Russia	Mukarramov		W
25	Kralya	Russia	Mukarramov		W
26	Sila	Russia	Mukarramov		W
27	Grom	Russia	Mukarramov		W
28	Afina	Russia	Latif Murod		W
29	Tr. Khatti	Turkey	Latif Murod		F
30	Krassar (durum)	Russia	Latif Murod		S
31	Nota	Russia	Latif Murod		W
32	Surkhak-5688	Tajikistan	TFI		F
33	Farhodi	Tajikistan	TFI		F
34	AIKT	Tajikistan	TFI		F
35	IZ-80	Tajikistan	TFI		F
36	Shumon	Tajikistan	TFI		F
37	Lalmikor 1	Tajikistan	TFI		F
38	Lalmikor 2 (durum)	Tajikistan	TFI		F

Note: W-winter wheat, S-spring wheat and F-facultative wheat

2.3. List of selected wheat varieties in Kyrgyzstan for disease resistance screening

#	Variety	Growth habit	Year of release	Breeder
1	Krasnodarskaya-99	W	2011	Lukyanenko Krasnodar SRIA
2	Dank	F	2008	KSRIF
3	Zubkov	W	2004	OJS “MIS”
4	Kayrak	W	2004	KSRIF
5	Polovchanka	W	2001	Lukyanenko Krasnodar SRIA
6	Kazakhstan-10	F	1990	KazSRIF
7	Intensivnaya	F	1978	KSRIF

Note: W-winter wheat, F-facultative wheat

2.4. List of selected wheat varieties in Uzbekistan for disease resistance screening

#	Variety	Origin	Year of release	Area, ha
	Varieties in irrigated area			
1	Krasnodar- 99	Russia	2006	393,500
2	Tanya	Russia	2006	298,900
3	Moskvich	Russia	2007	141,400
4	Kroshka	Russia	2000	66,000
5	Chillaki	Russia/Uz	2002	62,700
6	Nota	Russia	2007	38,100
7	Esaul	Russia	2011	27,000
8	Pamyat	Russia	2006	19,000
9	Kuma	Russia	2006	18,000
10	Polovchanka	Russia	1999	13,000
11	Nikoniya	Ukraine	2006	10,000
12	Kupava	Russia	1999	5,000
13	Dustlik	IWWIP	2005	30,500
	Varieties in rainfed area			
14	Surhak 5688	Tajikistan	1950	41,700
15	Krasnovodopad 210	Kazakhstan	1980	19,500
16	Sanzar 4	Uzbekistan	1990	13,500
17	Tezpishar	Uzbekistan	1980	12,100
18	Mars 1	Uzbekistan	2006	10,000
19	Intensivnaya	Kyrgyzstan	1981	5,300
20	Kukbulok	Uzbekistan	2001	3,500