# Development and Delivery of Ecologically-based IPM Packages in Central Asia

## Central Asia Regional IPM Program – Year 2 Workplans
## (October 1, 2010 – September 30, 2011)


**Project Management:**
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**IPM Communication:**
Ms. Joy Landis, Michigan State University

**Links with IPM CRSP Global Theme Projects:**
Pest Diagnostics**:** Dr. Sally Miller, Ohio State University
Viruses**:** Dr. Naidu Rayapati, Washington State University and Dr. Sue Tolin, Virginia Tech University
Gender Issues**:** Dr. Linda Racioppi and Dr. Zahra Jamal, Michigan State University and Dr. Maria Elisa Christie, Virginia Tech University
Socio-Economic Impact Assessment**:** Dr. Mywish Maredia and Richard Bernsten, Michigan State University, and Dr. George Norton, Virginia Tech University

Michigan State University (MSU) in partnership with University of California-Davis, Kansas State University, ICARDA, AVRDC, and several local research and academic institutions and NGOs is implementing a regional IPM program in Central Asia. The three host countries include - Tajikistan, Uzbekistan and Kyrgyzstan.

The technical objectives of the Central Asia Regional IPM Program are as follow:

1. Develop ecologically based IPM packages for wheat, tomato and potato through collaborative research and access to new technologies.

2. Disseminate IPM packages to farmers and end-users through technology transfer and outreach programs in collaboration with local NGOs and government institutions.

3. Build institutional capacity through education, training and human resource development.

4. Enhance communication, networking and linkages among local institutions in the region and with U.S. institutions, international agricultural research centers, and IPM CRSP regional and global theme programs.

5. Create a "Central Asia IPM Knowledge Network" encompassing a cadre of trained IPM specialists, trainers, IPM packages, information base, and institutional linkages.

The proposed activities for the period covering October 1, 2010 to September 30, 2011 are linked to the above five technical objectives. The current political situation in Kyrgyzstan and its impact in the region and travel restrictions imposed by the U.S. State Department have slowed/delayed the planning and implementation of the project activities in the region.

**Objective 1. Develop ecologically-based IPM packages for wheat, tomato and potato cropping systems through collaborative research and evaluation of new technologies and approaches.**

**Activity 1: Establish IPM Applied Research and Demonstration Sites** for testing and evaluating the existing and new approaches and technologies for IPM packages for Wheat, Potato and Tomato in three host countries (Tajikistan, Kyrgyzstan, and Uzbekistan). This will include cultural practices, botanicals and biopesticides, biological control agents/products, resistant varieties, pheromone traps, sticky traps, chemical pesticides, etc. The locations for the research and demonstration sites have been selected and detailed plans have been developed (see more details in the following sections). For Wheat IPM, the project will focus initially focus in Tajikistan, for Potato IPM, the project will initially focus in Kyrgyzstan, and for Tomato IPM, the project will initially focus in Uzbekistan.
**Participating scientists/institutions:** N. Saidov, B. Tashpulatova and M. Aitmatov, IPM CRSP project coordinators in Central Asia, Collaborators from ICARDA, AVRDC, U.S. Collaborators, local scientists from research institutions and universities in host countries.
**Expected output:** IPM Applied Research and Demonstration sites established in host countries for wheat, tomato, and potato crops.
**Time line:** October 2010 – September 2011

**Activity 1.A: Wheat IPM Research Demonstration Sites in Tajikistan**

**Site #1: Wheat IPM Package for Northern part of Tajikistan**

a. Name and Location of this site: Farm of Mr. Ilhom Boimatov located in the Spitamen district of Sogd region.

b. Key Pest Problems: At this site focus will be on the Sunn pest (*Eurygaster integriceps)* and diseases include the wheat rusts: yellow rust (*Puccinia striiformis*) and brown rust (*Puccinia recondite*). The key weeds in wheat field include; oat grass (*Avena fatua*), shepherd's purse (*Capsella bursa-pastoris),* pigweed or lambsquarters (*Chenopodium album)* and bermuda grass (*Cynodon dactylon*).

c. IPM Package Components: In this demonstration sites will test the following IPM package components:
1. Resistant Varieites: Plots of 10 X10 m planted to a resistant variety to yellow and brown rusts, 4 reps with two strips of flowering plants including coriander *(Coriandrum sativum L.),* dill *(Anethum graveolens L.),* sweet basil *(Ocimum basilicum L.),* ziziphora *(Ziziphora interrupta* Juz.), marigold *(Calendula officinalis L.)* and winter cress (*Barbarea vulgaris)* along side the wheat plots to enhance Sunn pest egg parasitoids.
2. Cultural practices (planting date, seed rate, fertilizer application, and weed control) will be as recommended in the country.
3. Hand collection of Sunn pest adults during 2-3 weeks beginning at the time of migration to wheat fields.
This package will be compared to farmers' practices in the same area.

d. Planting and harvesting time for wheat at this site: Wheat will be planted in October 2010 and harvested in June 2011.

e. Names of the local scientists and collaborators: Dr. Anvar Jalilov and Mr. Tavakal Mirzoev from Institute of Plant Production "Ziroatparvar" of Tajik Academy of Agricultural Sciences and Mr. Vokhid Nazirov a scientist from Institute of Zoology and Parasitology the Academy of Science of Tajikistan and students from IPM wheat class from the National University of Tajikistan (biology faculty) and Tajik Agrarian University.

**Site #2: Wheat IPM Package for Southern part of Tajikistan**

a. Name and Location of this site: Andreevka village in the Durbat Jamoat of the Hissor district.

b. Key Pest Problems: At this site focus will be on the cereal leaf beetle *(Lema melanopus)* and diseases include the wheat rusts: yellow rust (*Puccinia striiformis*) and brown rust (*Puccinia recondite*). The key weeds in wheat field include; oat grass (*Avena fatua*), shepherd's purse (*Capsella bursa-pastoris),* pigweed or lambsquarters (*Chenopodium album)* and bermuda grass (*Cynodon dactylon*).

c. IPM Package Components:
1. Biological Control: Plots of 10 X10 m planted to a resistant variety to yellow and brown rusts, 4 reps with two strips of flowering plants including coriander *(Coriandrum sativum L.)*, dill *(Anethum graveolens L.),* sweet basil *(Ocimum basilicum L.)*, ziziphora *(Ziziphora interrupta* Juz.), marigold *(Calendula officinalis L.)* and winter cress (*Barbarea vulgaris)* along side the wheat plots to enhance cereal leaf beetle parasitoids.
2. Cultural practices (planting date, seed rate, fertilizer application, and weed control) will be as recommended in the country.
3. Weed management with cultural practices and application of low toxic herbicides.
This package at these pilot sites will be compared to farmers' practices in the same area.

d. Planting and harvesting time for wheat at this site: Wheat will be planted in October 2010 and harvested in June 2011.

e. Names of the local scientists and collaborators: Dr. Anvar Jalilov and Mr. Tavakal Mirzoev the scientists from Institute of Plant Production "Ziroatparvar" of Tajik Academy of Agricultural Sciences and Mr. Vokhid Nazirov a scientist from Institute of Zoology and Parasitology the Academy of Science of Tajikistan and Students involved in IPM wheat class from the National University of Tajikistan (biology faculty) and Tajik Agrarian University.

**Wheat IPM Research in Kyrgyzstan and Uzbekistan**

For Wheat IPM research in **Kyrgyzstan**, the project will screen Cereal leaf beetle resistant varieties, and conduct survey of cereal leaf beetle parasitoids at two sites in Kyrgyzstan Sokuluksk district of Jui region, and Isikul region.

For Wheat IPM research in Uzbekistan, the project will evaluate the effects of flowering plants such as coriander, dill, sweet basil, ziziphora, marigold and winter cress in enhancing Sunn Pest egg parasitoids, and conduct survey of wheat nematodes in Tashkent region and Karakalpak region.

## Activity 1.B Potato IPM Research Demonstration Sites in Kyrgyzstan

**Site #1: Potato IPM Package for Issyku-Kul Region of Kyrgyzstan**

a. Name and Location of this site in Kyrgyzstan: Frunze village, Tupski district of Issyk-Kul region.

b. Key Pest Problems that will be addressed at this site: The IPM package for this site will focus on the Colorado Potato Beetle (*Leptinotarsa decemilineata*) and diseases a late blight of potato *(Phytophthora infestans) and* Potato leafroll viruses M, S, X, and Y. Potato cyst nematodes (*Globodera rostochienses* and *G. pallida*) and root-knot nematodes (*Meloidogyne chitwoodi* and *M. fallax*). The key weeds in potato at this site

include: weeds such as swine's-bane *(Chenopodium rubrum L.)* and houndsberry (*Solanum nigrum L.).*

c. IPM Package Components for this site: In this research and demonstration sites we will test the following IPM package components:
   1. To test three potato varieties for resistance to diseases and particularly resistance to late blight of potato (*Phytophthora infestans*); evaluate different potato varieties for resistance to insect pest and nematodes; Evaluate new potato varieties for adaptation to Issyk-Kul region condition.
   2. Biological control of potato spring inoculation of potato seeds and of field soil with Biopesticides such as Thrihodermin, Strepmaitis and Bacilus thurengiensis; Application of immune-response modulating agent as "Baikal" type; Application of "Bacillus subtilis"; Application of "Biolegnin"
   3. Potato Post-Harvest Storage: Identified local traditional knowledge's on potato post-harvest storage; Application of biological control; Application of botanical pesticides.

*d.* Planting and harvesting time for potato at this site: The trials consist two parts: The first experiments is storage of potato seeds in October 2010 within testing of Biopesticides such as Thrihodermin, Strepmaitis and Bacilus against of potato disease *Bacterial ring rot and Black scurf of potat;* And second experiment prior to potato seed sowing in the end of April 2011and till of potato harvest in the end of September 2011.

e. Names of the local scientists and collaborators: Dr. Tinatin Doolotkeldieva, local Ph. D students, Saikal Bobysheva and Mahabat Konurbaeva from a Laboratory of Phytopathology and Entomology of Faculty of Agriculture at Kyrgyz-Turkey University name after "Manas". Mr. Janibai Tumanov, Director of the Kyrgyzstan Central Biolaboratory, Bishakek, Kyrgyzstan.

**Site #2: Potato IPM Package for Osh Region of Kyrgyzstan**

a. Name and Location of this site in Kyrgyzstan: Uson Kyshnak village, the Osh area of Alaisky region.

b. Key Pest Problems: At this site, the IPM CRSP project will focus on the Colorado Potato Beetle (*Leptinotarsa decemilineata*) and diseases, late blight of potato *(Phytophthora infestans) and* Potato leafroll viruses M, S, X, and Y. Potato cyst nematodes (*Globodera rostochienses* and *G. pallida*) and root-knot nematodes (*Meloidogyne chitwoodi* and *M. fallax*) are also limiting factors. The key weeds in potato at this site include: weeds such as swine's-bane *(Chenopodium rubrum L.)* and houndsberry (*Solanum nigrum L.).*

c. List IPM Package Components for this site (example - Resistant Variety, Cultural Control, Biological Control, etc). In this demonstration sites will test the following IPM package components:
   **Varieties**

1. To test different potato varieties on resistance to diseases and particularly on late blight of potato (*Phytophthora infestans*); To test different potato varieties on resistance to insect pest and nematodes; To test new potato varieties in the Issyk-Kul region condition.
2. Biological control of potato spring inoculation of potato seeds and of field soil with Biopesticides such as Thrihodermin, Strepmaitis and Bacilus thurengiensis; Application of immune-response modulating agent as "Baikal" type; Application of "Bacillus subtilis"; Application of "Biolegnin."
3. Potato Post-Harvest Storage: Identification of local traditional knowledge's on potato post-harvest storage for pest control; Application of biological control; Application of botanical pesticides.

d. Planting and harvesting time for potato at this site: The trials consist two parts: The first experiments is storage of potato seeds in October 2010 within testing of Biopesticides such as Thrihodermin, Strepmaitis and Bacilus against of potato disease *Bacterial ring rot and Black scurf of potato;* And second experiment prior to potato seed sowing in the end of April 2011and till of potato harvest in the end of September 2011.

e. Names of the local scientists and institution that will collaborate at this site: Dr. Tinatin Doolotkeldieva, local PhD Students Saikal Bobysheva and Mahabat Konurbaeva from a Laboratory of Phytopathology and Entomology of Faculty of Agriculture at Kyrgyz-Turkey University name after "Manas". Mr. Talant Joldoshev - specialist from the MSDSP Kyrgyzstan Program of the Aga Khan Foundation.

**Activity 1.C Tomato IPM Research Demonstration Sites in Uzbekistan**

**Site #1: Tomato IPM Package for Greenhouse Farm in Tashkent**

a. Name and Location of this site - Farmer, Mr. Tojibaev Jasur, Tashgress area, Kibray District, Tashkent Region 100140, Uzbekistan.

b. Key Pest Problems: Insects: aphids *(Aphis gossypii*, *Myzus persicae* and *Aphis craccivora)*, leaf miner *(Lyriomyza sativa)*, whitefly *(Trialeurodes vaporarium)*; Diseases: *Fusarium oxysporum, Phytophthora infestans;* Weeds: Perennial plants: *Rumex crispus; Taraxacum officinale*.

c. IPM Package Components: Yellow sticky trap, use of microbiological preparations and fertilizers, ecological safety pesticides (fungicides, insecticides and herbicides).

d. Planting and harvesting time of the crop at this site: Planting from September - October and harvesting in May –June.

e. Names of the local scientists and collaborators: Dr. Djumaniyazova Gulnara; Mr. Zaripov Rustam - Institute of Microbiology Academy of science; Mr. Baijanov Bahodir - Research Center "Baykal":

**Site # 2: Tomato IPM Package for Greenhouse Farm at the Tashkent Agrarian University in Tashkent**

a. Name and Location of this site: Tashkent State Agrarian University, 2 Universitetskaya Str., Kibray district, Tashkent region, 100140, Uzbekistan.

b. Key Pest Problems at this site:
Insects: Leaf miner *(Lyriomyza sativa),* whitefly*(Trialeurodes vaporarium)*;
Diseases: *Cladosporium fulvum Cooke;*
*Weeds*: Perennial: Rumex crispus L., Cyperus rotundus L., Convolvulus arvensis

c. List IPM Package Components for each site:Yellow sticky trap, use of microbiological preparations and fertilizers, ecological safety pesticides (fungicides, insecticides and herbicides) and Grafting.

d. Planting and harvesting time for the crop at this site: Planting from September - October 2010 and harvesting in May – June 2011.

e. Names of the local scientists and collaborators:
Dr. Rashidov Murod; Dr. Suleimanov Botir – Biolaboratory Center "Biomarkaz" at Tashkent Agrarian University;
Mr. Pulatov Zarif – Uzbek Research Institute of Plant Protection
Dr. Shukhrat Asatov, Tashkent Agrarian University
Mr. Bakhtiyor Karimov, Tashkent Agrarian University.

**Site # 3: Tomato IPM Package for Open Field Culture in Tashkent Region**

a. Name and Location of this site: Uzbek Research Institute of Vegetable-Melon Crops and Potato Production, Tashkent region 111172, Uzbekistan

b. Key Pest Problems (insect, diseases, viruses, nematodes, weeds) that will be addressed at this site
Insects: White fly *(Trialeurodes vaporarium),* Fruitworm *(Heliothis armigera),* Leaf miner (*Lyriomyza sativa),* Russet mite *(Aculops lycopersici);*
*Weeds*: Annual: *Amaranthus retroflexus L., Amaranthus I., Xanthium strumarium, Setaria veridis, Enchinochloa crus-galli (L.) Et.Sch;* Perennial: *Circium ochrolepidium Juz. Plantago major* L;

c. IPM Package Components for each site: Pheromone trap, yellow sticky trap, use of microbiological preparations and fertilizers, ecological safety pesticides (fungicides, insecticides and herbicides).

d. Planting and harvesting time for the crop at this site: Planting from May-June harvesting in July-August-September;

e. Names of the local scientists and collaborators: Dr. Ganiev Farhod - Uzbek Research Institute of Vegetable-Melon Crops and Potato Production; Dr. Djumaniyazova Gulnara and Dr. Zaripov Rustam - Institute of Microbiology Academy of science;

**Activity 2: Conduct research on biological control practices/products, cultural control/practices and resistant varieties** for wheat, tomato and potato in collaboration with Ministries of Agriculture and local universities.
**Participating scientists/institutions:** N. Saidov, B. Tashpulatova and M. Aitmatov in collaboration with team members from MSU, UC-Davis, KSU, ICARDA, AVRDC and CIP, local research institutions and local universities. Many of the local scientists involved in the IPM research and demonstration sites will be contribute to the specific research projects.
**Expected output:** Biological control, host plant resistance and cultural control/practices evaluated for integration in IPM packages.
**Time line:** October 2010 – September 2011.

**Objective 2: Disseminate IPM packages to farmers and end-users through technology transfer and outreach in collaboration with local NGOs and government institutions.**

**Activity 1: Establish Farmers Field Schools (FFS) at IPM Demonstration sites** in each country to transfer knowledge and demonstrate existing and new IPM technologies to local farmers
**Participating scientists/institutions**: N. Saidov, B. Tashpulatova and M. Aitmatov in collaboration with local agriculture ministries, local NGOs, universities, ICARDA regional program, AVRDC regional program, and U.S. Collaborators. As outlines in the Objective 1, the sites have been selected in each country and plans are being developed for the next planting season. One FFS of 25-30 farmers each will be established at each site/country. These farmers will meet regularly to learn about how to produce a good wheat, potato or tomato crop. They will also learn about the biology of pests, diseases and weeds, and the damage they cause, the economic threshold, natural enemies, and cultural practices, and safe use of pesticides.
**Expected output**: Farmers Field Schools established at IPM Demonstration sites for wheat, tomato and potato in each of the three countries, and information shared with local farmers and NGOs (20 -30 farmers per FFS).
**Timeline:** October 2010 – September 2011.

**Objective 3: Build institutional capacity through training and human resource development.**

**Activity 1: Graduate student training in IPM in wheat, tomato and potato:** From a pool of 18 potential candidates from Central Asia region, three students (Ms. Shahlo Safarzoda from Tajikistan for Wheat IPM, Mr. Bahodir Eshchanov from Uzbekistan for Tomato IPM, and Mr. Azamat Mamytov from Kyrgyzstan for Potato IPM have been selected for pursuing Ph.D degree programs at MSU with specialization in Wheat IPM, Tomato IPM, and Potato IPM. The program

will begin from Fall 2010/Spring 2011. The paper work is in process for obtaining J-1 Visa and the Ph.D students are expected to arrive in the U.S. in October/November 2010.
**Participating scientists/institutions**: D. Landis, F. Zalom, D. Douches, G. Bird, W. Pett, M. Kennelly, K. Maredia, M. Bohssini, R. Mavlyanova, B. Tashpulatova, N. Saidov, M. Aitmatov, and faculty members of local universities in Central Asia.
**Expected output**: Ph.D Degree program/training for three students started at MSU. Additional students identified for master degrees training at local universities in each host country.
**Timeline:** October 2010 – September 2011.

**Activity 2**: **Pest Diagnostics and Viruses:** In collaboration with two global theme programs, organize a regional training program in Kyrgyzstan in pest diagnostics and viruses for the Central Asia region. The workshop will be hosted at the Plant Protection Department of Kyrgyz-Turkish Manas International University which has excellent laboratory facilities. Given the current political situation in Kyrgyzstan, there is an alternative plan to host the training workshop in Tajikistan. The project will also facilitate participation of scientists from host countries in IPDN's training programs at Ohio State University. In addition, conduct survey of tomatoes and potatoes in Central Asia region (Uzbekistan, Tajikistan and Kyrgyzstan) to identify viruses and virus-like agents, and explore the feasibility of testing potato seed for common viruses, such as PVX, PVS, PVY (and others) in Uzbekistan.

**Participating scientists/institutions**: T. Doolotkeldieva, N. Saidov, B. Tashpulatova, Zarifa Kodirova, and M. Aitmatov in collaboration with global theme programs in pest diagnostics and viruses (Sally Miller-OSU, N. Rayapati-WSU, Sue Tolin-Virginia Tech).

**Expected output**: Enhance pest diagnosis skills of local scientists and NGOs, and efficient diagnosis of insect pests, diseases, weeds, nematodes, and viruses in wheat, potato and tomato.
**Timeline:** January 2011 – September 2011.

**Activity 3: Gender Issues in IPM:** Addressing gender issues is an important component of the IPM CRSP project. We have identified Ms. Shoira Pahlavonova from Tajikistan to serve as the coordinator of the gender related activities in the region. The gender team will address:

1. The Gender Team will initially focus in Tajikistan:
    a. Create an inventory/directory of gender specialists/outreach workers in IPM CRSP host countries (Tajikistan, Kyrgyzstan and Uzbekistan);
    b. Facilitate research inquiries and information gathering; and
    c. Develop and execute at least 1 gender-related training or workshop
2. Outline opportunities for research on gender in agriculture in consultation with our Gender Coordinator and partners.
3. Visit the wheat IPM demonstration sites in Tajikistan, potato IPM demonstration sites in Kyrgyzstan, and tomato IPM demonstration sites in Uzbekistan. On each visit, meet with women farmers and conduct a Rapid Gender Assessment.
4. Identify and engage student researchers to help evaluate gray literature and to write research reports on gender and agriculture in Central Asia.

**Participating Scientists and Collaborators:** L. Racioppi, Z. Jamal, M. Elisa Christie and S. Pahlavonova.
**Expected Output:** Increased awareness on gender issues and gender equity in IPM programs
**Time Line:** October 2010 to September 2011.

**Activity 4: Impact assessment of IPM CRSP project activities in Central Asia:** Given the early stages at which the project is on the "research to development" continuum, the impact assessment component of this project will focus on the following activities in FY 2011:

1. Construct impact pathways for research activities on wheat, tomato and potato in the three target countries: The project will organize a focused discussion with each commodity research team to complete a spreadsheet to document the team's actions to generate major outputs, outcomes and realization of the vision of success. The analysis will also capture the projected scale and time dimension for achieving these major milestones along the impact pathway. The construction of these impact pathways will help identify outputs of this project that have the greatest potential for achieving 'developmental impacts' as defined by adoption and scalability. This information will help guide the scope of the baseline surveys also planned in FY 2011.

2. Conduct baseline assessment: In coordination with the Impact Assessment Global theme, the component PIs will follow a standard set of steps to help assess the economic impacts of major outputs (as identified from the impact pathway analysis) to be generated by this regional project. The first step towards this analysis includes conducting baseline surveys to assess the status of wheat, potato and tomato sectors in three target countries Tajikistan, Kyrgyzstan and Uzbekistan. The size, scale and scope of the survey will be a function of the potential adoption sites and resources available. The baseline data to be collected will include: a) data on input, output, and price; b) crop management practices (including the use of biological, cultural, chemical, etc.) and their associated costs; c) farm household characteristics and demographic data; d) farmer perspective on potential constraints to adoption of IPM technologies; e) gender role in the cropping systems of focused commodities.

If additional resources are made available, baseline data (primary and secondary) will be also collected to help assess broader impacts on poverty, nutrition, health, risk, and the environment. Qualitative assessments using participatory appraisals and focus groups will also be used in collaboration with the Gender global theme to identify potential gender impacts.

**Collaborating Scientists and Institutions:** R. Bernsten and M. Maredia, Michigan State University; Host Country PIs (B. Tashpulatova, M. Aitmatov, and N. Saidov) and other U.S. and host country collaborators.
**Expected Outputs:** 1)A report on the impact pathway analysis; 2) Data and preliminary analysis of the baseline assessment.
**Start and end-date:** October 1, 2010 to September 30, 2011.

**Activity 5: Participation of two local scientists from host countries in International IPM short courses organized by MSU and ICARDA.**
**Participating scientists and institutions**: Scientists and NGO representatives from Central Asia, MSU and ICARDA.

**Expected output**: Increased knowledge in ecologically-based IPM.
**Timeline:** January 2011 – September 2011.

**Activity 6: Organize local workshops and training programs** for trainers and farmers on scouting and monitoring for key pests and diseases in wheat, tomato and potatoes during the growing season.
**Participating scientists/institutions**: local NGOs, Government institutions, IPM CRSP team
**Expected output**: At least 50 farmers and 5 trainers trained in pest scouting and monitoring.
**Timeline:** October 2010 – September 2011.

**Objective 4: Enhance communication, networking and linkages with U.S. institutions, international agricultural research centers, and IPM CRSP regional and global theme programs to access IPM technologies, information and expertise.**

**Activity 1: Participation in International Meetings and workshops:** Facilitate participation of IPM CRSP coordinators and local scientists from host countries to interact with IPM CRSP Regional Programs and other international meetings and workshops.
**Participating scientists and institutions**: N. Saidov, B. Tashpulatova and M. Aitmatov
**Expected output**: Enhanced linkages and collaborations with IPM CRSP regional programs, and other international programs.
**Timeline:** October 2010 – September 2011.

**Objective 5: Create a "Central Asia IPM Knowledge Network" encompassing a cadre of trained IPM specialists, students, IPM packages, information base, and institutional linkages.**

**Activity 1: Update, expand and enhance the website of the Central Asia regional IPM program** in collaboration with project team members. Use social networking and other means to publicize on-going activities of the project.
**Participating scientists/institutions**: J. Landis, MSU.
**Expected output**: Enhanced communication with stakeholders, expanded access to resources and knowledge developed in other activities, greater publicity for IPM CRSP project impacts.
**Timeline:** October 2010 – September 2011.

**Activity 2: Development of field guides/manuals, booklets and/or modules on IPM in wheat, tomato and potato.**
**Participating scientists and institutions**: N. Saidov, B. Tashpulatova and M. Aitmatov in collaboration with local Agriculture Ministries, local NGOs, ICARDA regional program, and other regional programs of the IPM CRSP.
**Expected output**: Field guides/ booklets published and disseminated.
**Timeline:** October 2010 – September 2011.

**Activity 3: Booklet and poster on tomato grafting**
**Participating scientists and institutions**: Uzbek Research Institute of Plant Industry (UzRIPI), Tashkent State Agrarian University (TSAU), AVRDC/World Vegetable Center

**Expected output:** A booklet and poster on tomato grafting will be published in English and Russian (or appropriate local language).
**Timeline:** October 2010 – March 2011.

**Activity 4: Flyers on IPM Packages for Wheat, Tomato and Potato**
**Participating scientists and institutions**: J. Landis and Project Team (U.S. and Central Asia Collaborators).
**Expected output:** Three flyers will be published and posted on the IPM CRSP website, and distributed to stakeholders.
**Timeline:** October 2010 – September 2011.

**Activity 5: Publications from phase I Accomplishments**
**Participating scientists and institutions**: K. Maredia, U.S. and Central Asia collaborators.
**Expected output:** A Review Paper covering accomplishment of Phase I (2005- 2009) to increase the awareness of the work done in Central Asia.
**Timeline:** October 2010 – March 2011.

**Activity 6: Prepare and Display Project Poster**
**Participating scientists and institutions**: J. Landis and U.S. and Central Asia collaborators.
**Expected output:** A poster highlighting the Central Asia Regional IPM Program activities for display at workshops and conferences in Central Asia region and internationally.
**Timeline:** October 2010 – September 2011.