



State Agency of Forestry and  
Environmental Protection,  
Kyrgyz Republic

## Pistachio and Walnut Development Project

TCP/KYR/3203 (D)

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## Agriculture in Kyrgyz Republic

- Cereals - 1.5 mln MT,
  - including wheat 0.7 mln. MT
- Potato - 1.3 mln. MT
- Vegetables - 0.8 mln. MT
- Fruits - 200 000 MT
- Grapes - 10 000 MT

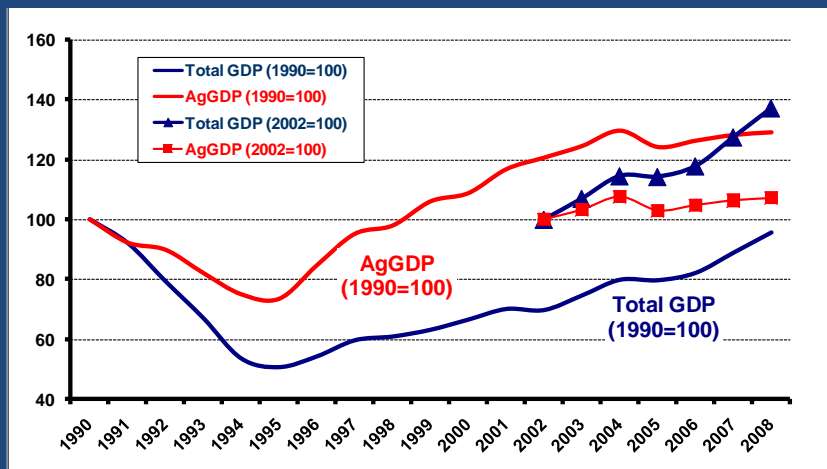


## Why pistachio and walnut?

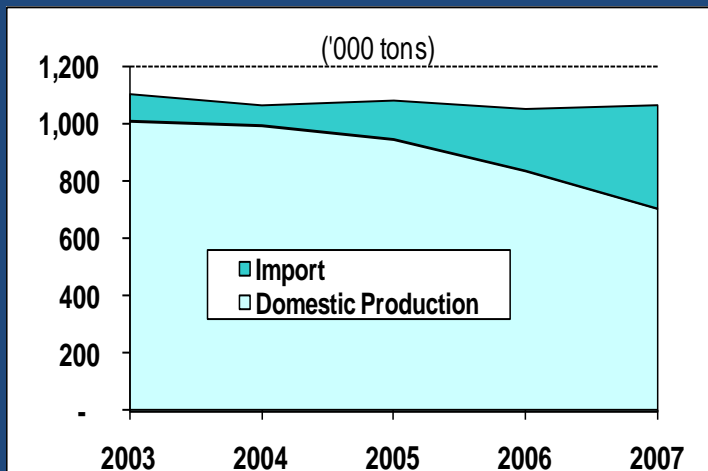
	Total Area, ha	Plantation Area, ha	Production, MT	Yield, kg/ha
Pistachio	57 000	12000	1 000	15-20
Walnut	47 000	-	900-1 900	20-40



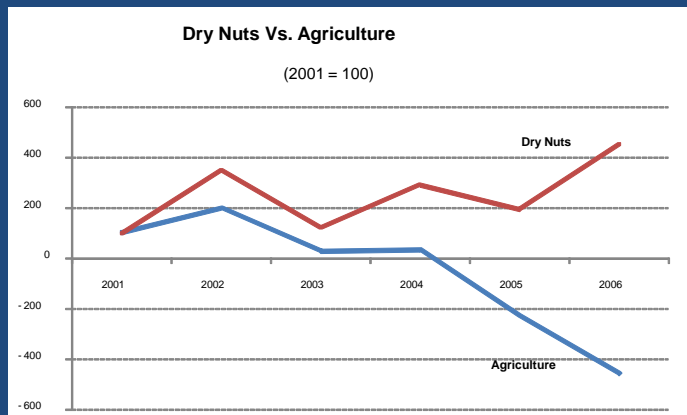
## Agriculture growth vs Overall Growth



## Wheat Grain Trade Balance

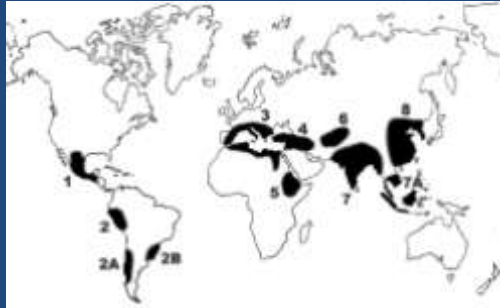


## Trade Balance Values



## Why pistachio and walnut?

- Central Asia – centre of origin & diversity of nuts
- Large area of forest plantations
- Suitable climatic conditions (dry summer)
- Suitable socio-economic environment
- Organic forests





## Why pistachio and walnut?

- Absence of market orientation in the past
- Current varieties not valued for international market
- No management done (cutting, pruning, etc.)
- Density is high, pistachio male/female ratio not regulated
- Yield is low
- History of quality produce
- International standards (USA, France, Chile, Australia)
- Demand increase
- Potential for export
- Increasing farmers income & Livelihood improvement

## Why pistachio and walnut?

*Development of the nut fruit sector has a high potential in improving livelihood and food security due the high international demand...*



## Past and Related Work

- Tien Shan Ecosystem Development Project (IFAD; GEF; WB-Bio Carbon Fund; Japanese Government). Starting date is expected to be October 2009
- Kyrgyz-Swiss Forestry Support Programme - 1995-2009
- Agricultural Investments Support Project (World Bank) – started in 2009
- Agribusiness and Marketing Project (World Bank) – commenced in 2005.
- Forests and Rural Livelihood in the Kyrgyz Republic - Development Potentials (World Bank Programme on Forests PROFOR) – a study is in a pipeline
- In situ/On farm preservation and use of agri-biodiversity of fruit plants in the Central Asia – Bioversity Int., 2006-2010

## **What could be done to improve nut production?**

- Demonstrative pistachio plots on grafting of male trees with selected autochthonous female genotypes.
- Budding the upper part of the sucker.
- Technical actions: tree thinning to favour light penetration or severe pruning to stimulate more vegetative and reproductive activity.
- Introduction of appropriate machinery (sieving, dryer, and nut cracker), currently not available in the country.
- Selection of superior genotypes - WFRI in Jalalabad has already selected 60 genotypes considered to be of superior quality that could be used in specialized orchards out of the forestry area.

## **Who are the beneficiaries?**

- Forestry farms/departments (Leskhoz)
- Technical and management officers at central, oblast, rayon, village, and farm level
- Researchers from WFRI and the FRI
- Farmers and cooperative farms in the selected target areas will improve their knowledge and skills in orchard establishment, tree grafting and pruning.
- Packers, wholesalers, retailers and marketing agents of dried nuts after processing
- Women are the main labour force on nursery production and in the fruit orchards.
- Women have also specialized in grading and packing of fruits, which offer employment for several months.



## Objective

To contribute in increased pistachio and walnut fruit production by using varieties with higher-yielding potentials and introducing more efficient, environmentally sound soil and crop management practices.

## Walnut and Pistachio

- Assist in modern seedling production propagation technologies
- Training on clonal rootstock production to establish uniform and high yielding orchards
- Training on maintenance management of *ex situ* germplasm of walnut and pistachio (leaving the fruits on the tree creates a negative competition between the vegetative and the reproductive functions)
- Post-harvest technology is the final steps required to improve competitiveness of the produce at international market.



## Pistachio

- Know-how transfer on grafting of pistachio adult trees in the forestry planted areas.
- The “Back pruning technique” of adult plants (reshaping), will promote better physiologic condition (re-juvenility) of the grafted trees that allows overcoming grafting reject issues
- The establishment of a correct plant density - not more than 400 plants/ha, 95% of female plants
- Re-shape the canopy in order to favor light penetration and air circulation.
- Introduction integrated and other methods to control gypsy moth
- The pistachio seedlings growth must be forced in such way to be grafted in one year in order to reduce by half the seedling cycle production time from the current 36 months to 18 months.

## Walnut

- Introduction of the “Hot Callusing Grafting Technique” allows overcoming grafting reject issues
- Knowledge transfer as how to propagate selected superior walnut genotypes
- Specifically established orchards may become an alternative to the forestry crop
- Demonstration plots on correct orchard management technology (canopy pruning, grafting, semi-mechanization of harvesting, etc.), particularly applied to lateral bearing varieties.

## **Project framework**

- Promoting the establishment of a typical 10 ha pilot walnut orchard external to the forest area
- Selection of 100 ha of pistachio plantation for trailing of improved production and management techniques (50 ha for grafting & 50 ha for thinning technique demonstration)

## **Impact**

Contribute to the national agriculture and forestry areas sustainable development through establishing the basis for the improvement and modernization of the pistachio and walnut production sector with significant output to food security, employment opportunities and income generation.

## **Outcome**

The opportunity for the Kyrgyz Republic to invest and improve national pistachio and walnut production as a means to improve rural income and food security is demonstrated.

WORKPLAN

OUTPUTS/ACTIVITIES	Year 1												Year 2					
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
<b>Output 1 Re-modelling 100 ha of pistachio forest plot</b>																		
Activity 1.1 Organization contract and training with <i>Leskhoz</i>	x																	
Activity 1.2 Grafting and thinning operations: in march, prepare adult tree rootstock, collect scions, grafting. In July, August and September remove suckers from grafted trees and re-graft failed grafted). Same activities on the second year							x	x	x								x	x
Activity 1.3 In the first year, shaping grafted trees: removing suckers, back-cut of scions and using of the buds for failed grafted shoots. In the second year: on winter time, pruning and recovering of scions; on summer pruning. Pruning shaping of grafted trees, graft (cut applied to grafted trees, removing suckers, continue graft)							x	x									x	x
Activity 1.4 Nursery activity (in the winter time collect and seed stratification; in the spring hypocotyls grafting of potted seedlings)	x	x					x	x					x	x			x	x
Activity 1.5 Reinforce germplasm collection (severe cuts pruning to rejuvenate the existing mother plants. Identify new accessions and collect scions). Planting of seedlings as further rootstock for the introducing superior genotypes						x	x		x	x							x	x
<b>Output 2 Establish of 8+2 ha walnut orchard</b>																		
Activity 2.1 Organization contract and training with <i>Lexhoz</i> and Land preparation, Import of foreign varieties, Planting	x	x															x	x
Activity 2.2 Grafting of local selection (by hot callusing and hypocotyls techniques)			x	x			x	x									x	x
Activity 2.3 Pruning of mother plants, collect scions			x				x	x									x	
Activity 2.4 Nursery activity (collect and seed stratification; hypocotyls grafting of potted seedlings)	x	x					x	x									x	x
<b>Output 3 Basic knowledge for nut quality improvement</b>																		
Activity 3.1 Training on machines needed to improve nut quality							x										x	
Activity 3.2 Training on international UN-ECE rules							x										x	
<b>Trainings</b>																		
Activity 3.4 Training courses (4): hot callusing, hypocotyls grafting, orchard management of walnut and pistachio							x		x								x	
Activity 3.5 Study tour in Italy (walnut) and Iran (pistachio) of two national experts										x								
Activity 3.6 Final workshop																		x
<b>Project personnel</b>																		
Recruitment of the National Project Coordinator	x																	
Recruitment of International Team leader and visits				x			x										x	
Recruitment of two national expert on walnut and pistachio				x														
Technical backstopping (AGPC officer)				x													x	
TSS Agriculturalist FAOSEC				x														
TSS Agronomist TCIE									x									

## Outputs

### Output 1: Pistachio.

Re-modelling of 100 ha pistachio in Jalalabad and Batken current forest areas with KB-1, UT-3, KB-11, KB-13, B-3, Damgan (local genotypes) and CU-5, AX, A-85, A-8, A-95 and Sfax (imported genotypes), available at Kara Bulak Research Station. In detail:

50 ha (45 in Jalalabad and 5 ha in Batken) through re-grafting (and thinning) of male trees with selected varieties to an adequate proportion and tree density.

50 ha through thinning out of mainly male trees to establish a regular orchard density of 300-400 plants/ha (45 ha in Jalalabad and 5 ha in Batken)

### Activity 1.1:

Organization, training and contracting of a Community Forestry Group (a CBO type) for execution of field operations to apply the grafting techniques to the adult trees. A group of about 30 people will be trained mainly, on pistachio propagation, grafting and pruning/thinning techniques.

### Activity 1.2

First year initial operations will consist of: severe pruning of mother plants and of male trees; grafting of around 10000 male trees in 45 ha in Jalalabad and 5 ha in Batken; maintenance of 8-10 percent male trees kept un-grafted to preserve the pollinating functions.

### Activity 1.3

Thinning out of trees exceeding the plant density of 300-400 trees/ha in 50 ha in Jalalabad and Batken; and pruning of the remaining trees (around 10000) to make a rational canopy shaping. Some selected pruned shoots (superior females) will be stored in refrigerator room or in natural cold condition and used as budstick for grafting activity.

### Activity 1.4

Nursery training to produce potted seedling. Seeds (around 1000) will be stratified and stored at 2-4°C for 2 months before they are sown in a pot. The obtained seedlings will be subject to early grafting hypocotyls techniques. Selected genotypes by the WFRI will be used (this activity is preparatory to the following one).

### Activity 1.5

Expansion of the pistachio germplasm collection. Although some selection by the WFRI of Jalalabad already occurred, it is assumed that the potential of the forestry isn't exhausted. Further selected pistachio material of high potential (high yielding of big fruit size female trees, together with late blooming male trees) will be included in the collection for further valorization.

### Output 2.: Walnut.

10 ha pilot walnut orchards established at the *Leskhoz* area of Bazar Korgon rayon and managed with up-to-date technologies and production systems. 8 ha with pre-selected national genotypes (such as Ak Terek, Peaked, Osh, Uighur), together with 2 ha of well-known international varieties (for instance Lara, Franquette, Serr) will be established. These genotypes are characterized by big fruit size, or late sprouting (therefore resistant to late frost damages) or lateral bearing.

### Activity 2.1:

Organization, training and contracting of a Community Forestry Group (a CBO type) for execution of field operations, concerning the apical and lateral bearing varieties. A group of about 10 people will be trained mainly, on walnut and orchard management.

### Activity 2.2:

Technical staff training on hot callusing and hypocotyls grafting techniques as well as on the full chain of grafting: rootstock treatments, scion preparation, grafting and post-care of the grafted seedlings.

### Activity 2.3:

Pruning of autochthonous mother plants to promote the vegetative growth; grafting; and introduction of superior commercial varieties. Mother plants will be pruned in such a way that the tree must produce vegetative buds only, and this technique will replace the current one based on cutting shoot from producing trees and used as scions.

### Activity 2.4:

Nursery establishment and management. From seed treatment (selection, stratification) to grafted seedling pruning, finalized to obtain standard material. The walnut market of seedling has specific selling rules that take into consideration minimum height and diameter size parameters.

## Sustainability

- Government will own a development model and have gained institutional and operational capacity in nut fruits development
- On-going and in the pipeline projects would offer possible financial resources and collaborative agreements
- Institutional capacity will grow at the level of the state agencies, ministries and research institutes
- Technical capacities will improve and fill in technological gaps.
- Created collaborative arrangements with specialized external capacity will put the country's resources in a better position to continue to tap its development potential.
- Grafting with selected varieties for the pistachio plantation will also allow a considerable production of buds
- Drafting through FAO an investment proposal for the government to seek for funding consideration.
- Disseminating the project results at the international foras

## Institutional Framework and Coordination

- AFEP responsible for the implementation of the project and operates field operations in partnership with WFRI.
- AFEP Deputy Director (Forestry) appointed as the Chair of the Project Steering Committee (PSC).
- AFEP designated the National Project Coordinator (NPC).
- PSC will act as an oversight body to provide policy guidance, and includes the NPC and members from other concerned government bodies of MAWRPI; WFRI; FRI; the director of the Tien Shan Ecosystem Development Project; and the FAO AR in the Kyrgyz Republic).
- Under the PSC, there is a Technical Team (TT) made of national consultants responsible for all technical work.
- The TT is a team - 1 Pistachio and 1 Walnut specialist – Team Leader and shares responsibilities of the technical work with the FAO Lead Officer of the project.
- The AFEP, PSC and TT would be the primary drivers of the TCP. FAO would provide technical inputs into the project, which however remains a responsibility of the Government of the Kyrgyz Republic.



## Strategy/Methodology

- The TCP assistance is a straight-forward development activity.
- The work will consist of assistance to grafting, thinning, orchard management, and germplasm management activities.
- The work will complement and benefit from on-going and planned activities.
- A series of advisory services through international experts, FAO specialists, TCCT expertise will provide the up-to-date knowledge and exposure to best practices, which will all contribute to increased capacity and relationships to be sustained even after project completion.
- The AFEF, the PSC and the Technical Team (national consultants) will ensure a regular monitoring of the project, including international inputs via video conferencing with non-resident stakeholders.

## Schedule of the project phases:

### Inception Phase (2 months)

- appointment of NPC and national staff;
- meeting of the PSC;
- allocation of office space;
- start inputs for procurement of materials and equipment;
- recruitment of international/TCCT consultants;
- recruitment of national consultants on pistachio and walnut;
- training activities;
- 1st visit of the international consultant, nut propagation specialist;
- 1st backstopping mission by the FAO Lead Technical Officer;
- preparation of the detailed project work plan;
- inception workshop;
- assessment of pistachio and walnut production situation in the country.

### **Implementation Phase (13 months)**

- grafting, thinning and planting activities;
- training activities and study tours;
- 2nd and 3rd visits of the international consultant
- 2nd backstopping mission by the FAO LTO;
- provision of technical assistance on propagation
- monitor performance of the plantation.

### **Finalization and Evaluation Phase (3 months)**

- finalization of the remaining activities
- evaluation of achievements;
- formulation and adoption of the action plan and recommendations;
- 4th visit of the international consultant
- 3rd backstopping mission by the FAO LTO;
- provision of technical assistance on propagation
- analysis of project results;
- final project workshop;
- final evaluation;
- preparation of the draft terminal statement;
- project closure.

## **Government Inputs**

- Selection of the pistachio re-modelling areas and for the site where the walnut pilot orchard will be established, in good time for the arrival of the shipment of plants to be supplied by European or Turkish nurseries.
- Making available to the project the selected pistachio and walnut genotypes growing in the country.
- The project will arrange for a one-time introduction of equipment and supplies needed for orchard establishment and for training activities. It is assumed that farmers will be able to access similar materials, supplies and inputs, including quality grafted plants of superior varieties, at affordable prices for widespread replication of the production systems demonstrated.

## **Financial and/or contributions in kind**

- Land (100 ha) for re-modelling pistachio plantation in Jalalabad and Batken oblasts;
- Land (10 ha) for walnut pilot orchard in Jalalabad region;
- Land (0,5 ha) for nursery activities;
- Adequate implementation arrangements with all concerned stakeholders ;
- Seedlings/planting material output capacity from nursery/ies in Jalalabad and Batken oblasts;
- National Project Coordinator;
- Identification of trainees and nomination of study tour participants;

## **Financial and/or contributions in kind**

- Organization of training sessions, arranging for the venues and providing any available equipment needed;
- Ensure that equipment, materials and supplies are at all times available for use by the project;
- Local transportation of planting material, equipment and other inputs to project sites;
- Clearance of international personnel;
- Tax exemptions and customs clearances for all equipment imported by the project

## **FAO Contribution**

- Personnel services
- International Expert on Nuts Production
- TCCT: One Fruit Tree Grafting specialist and Nut fruit orchard management specialist
- FAO Technical Support Services (TSS) – AGP, FAOSEC and TCI
- National Consultants: National Walnut specialist, National Pistachio specialist and Community/farmers organization specialist
- Casual Labour
- Contracts, letters of agreements or contractual service agreements
- Materials, supplies and equipment.
- Training and Study Travel
- Operating expenses

## **Oversight, monitoring, management information and reporting**

- Monitoring to be carried out by the project team in collaboration with the FAO.
- Rapid surveys during the inception phase to establish the extent of farmers' knowledge of sustainable fruit production practices will provide the baseline against which changes in knowledge and adoption of modern practices will be measured by the end of the project.
- The final workshop will be the participatory forum for examining progress and impact and for mapping out the follow-up strategy to be promoted by the Government.
- Monitoring of project progress and implementation will be the primary responsibility of the Chair of the PSC (Director of AFEP) through the NPC and the Budget Holder (FAO Sub-Regional Coordinator) which shall have weekly tele-meetings of which this project will be a regular agenda item. Regular NPC-PSC/TT meetings will monitor progress of each output.

## Reporting Schedule

- Each international or national consultant, including FAO personnel providing technical support services has to prepare a **mission report** containing the main results, conclusions and recommendations.
- The National Project Coordinator and the National consultants will prepare quarterly project implementation reports (QPIRs) for submission to the FAOSEC
- The final project reporting requirement is a **terminal statement**, presenting the main results and conclusions of the project in addition to FAO's recommendations to the Government of the Kyrgyz Republic.
- FAOSEC as the LTU will have responsibility to ensure that this terminal statement is issued in a timely manner and is of a suitable quality.
- The terminal statement will be finalized at FAO headquarters and transmitted to the Government of the Kyrgyz Republic according to standard TCP procedures.
- Within one year after completion of the project, the recipient Government should submit a brief report on action taken on the main recommendations resulting from the project.

## Conclusion

- Pistachio and walnut development is important for economy growth and livelihood improvement in Kyrgyz Republic
- Lack of technical capacity in grafting and managements of orchards
- TCP will help to:
  - strengthen the technical capacities and fill in technological gaps.
  - create collaborative arrangements between local and international institutions
  - introduce new germplasm and efficiently use local ones
  - improve nut fruits production by quantity and quality
  - drafting through FAO an investment proposal for the government to seek for funding consideration.
  - disseminating the project results at the international foras.



THANK YOU