

geres

9 ways of saving energy

for rural households



Catalogue

efficient technologies



Depleting forests by cutting trees for firewood to heat houses and to use for cooking

INTRODUCTION

Caravans of donkeys with heavy loads of wood are a very familiar sight for us. For years, rural residents of our country have used local natural resources, such as wood and manure, for fuel. Wood and dung have been used as fuel in national, handmade cooking and baking ovens as well as in old, inefficient heating stoves. Consequently, the available fuel stock has diminished.

In areas where forest reserves were depleted, people have started using cow dung. Such practices have deteriorated the quality of soil, rendering many agricultural lands useless.

As a result, we are negatively impacting local environment, increasing the risk of various natural disasters such as floods, droughts, deterioration of the quality of soil used

for agriculture, and the drying up of springs.

Residents of rural areas are already feeling the negative impacts.

In order to prevent such risks from turning into tragedies in Tajikistan, it is important for us to determine and undertake measures toward energy efficiency.

Therefore, this catalogue, which was developed based on real experiences, offers you several types of efficient technologies made mostly from local materials.

1 USD = 4.7560 Tajik Somoni
1 EUR = 6.0911 Tajik Somoni



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INTRODUCTION



Mirzoqurbon POCHOEV
 Energy Manager
 GERES Tajikistan
 -Group for the Environment, Renewable
 Energy and Solidarity

“ Nowadays, heating houses during the cold season is a daily struggle in most rural areas of the country. This is mainly due to high fuel prices (for coal and wood) and, sometimes, due to lack of local fuel. Transporting fuel from one place to another makes already pricy fuel even more expensive. Therefore, it is important for us to use available fuel efficiently. By using home insulation technologies and efficient stoves for heating houses and for cooking, and by constructing verandas to heat homes during sunny winter days, rural residents can save up to 50% of their fuel. I hope that not only homes, but also peoples’ hearts, will always be warm during the cold seasons.”



Christine ORIOL
 Rural Development Coordinator
 GERES Tajikistan
 -Group for the Environment, Renewable
 Energy and Solidarity

“ Energy efficiency in agriculture creates new opportunities for farmers. By using solar green houses, solar poultry farms and bioclimatic cellars during winter and early spring, you can produce fresh vegetables, grow seedlings, store potatoes, apples and pomegranates for a longer time and chickens can lay eggs. Most importantly, you can accomplish this without using energy (wood, coal, or electricity) for heating or cooling. Therefore, I hope that farmers will take advantage of such technologies to improve the winter diet of their family and neighbors with fresh vegetable and eggs. It will let them not only supplement their own and neighbors’ food rations, but will also increase their revenue by putting products on the market.”



Solar terrace is one way to heat the house

SOLAR ARCHITECTURE

...is used for heating houses during the sunny days of the winter.

Families can now spend time outside during the sunny days of winter.



Because of the low quality of insulation systems in residential buildings, people must burn large amounts of fuel to heat their houses in the winter .

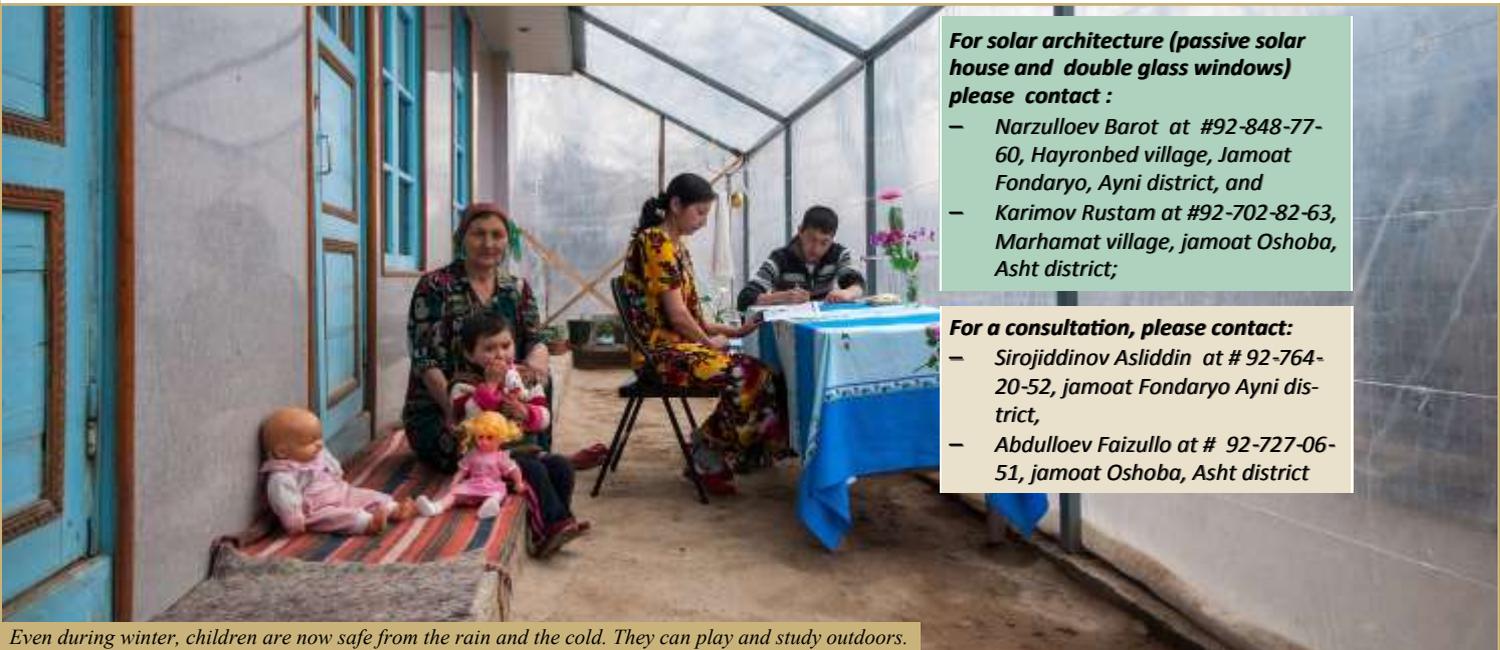
Using a passive solar house during the sunny days of winter enables a family to warm the house without using stoves and saves up to 30% of their fuel.

If the heating season lasts 5 months, savings for just one season can reach 3,900 kWh (kilo Watt hour) of energy, equivalent to **1.4 cubic meters of wood**, or **0.6 tons of coal**.

Passive Solar Houses are very good for growing plants in the winter



The price for one passive solar house with a room 6 meters long is approximately 1,800 Tajik Somoni.



For solar architecture (passive solar house and double glass windows) please contact :

- Narzulloev Barot at #92-848-77-60, Hayronbed village, Jamoat Fondaryo, Ayni district, and
- Karimov Rustam at #92-702-82-63, Marhamat village, jamoat Oshoba, Asht district;

For a consultation, please contact:

- Sirojiddinov Asliddin at # 92-764-20-52, jamoat Fondaryo Ayni district,
- Abdulloev Faizullo at # 92-727-06-51, jamoat Oshoba, Asht district

Even during winter, children are now safe from the rain and the cold. They can play and study outdoors.



“ This winter we used only half of our fuel, because now we don’t heat the house during the sunny days. Before, the moment we opened the door, we would let a cold wave of air swiftly enter the house. But now, to the contrary, we keep the door open to let the warm air from the terrace into the house. Also, the solar terrace keeps our shoes safe from the rain and the snow and protects our house from street dust. Thanks to the passive solar house, this year we saved 750 TJS by reducing 50% of our usual fuel consumption. This amounts to big savings for us! ”

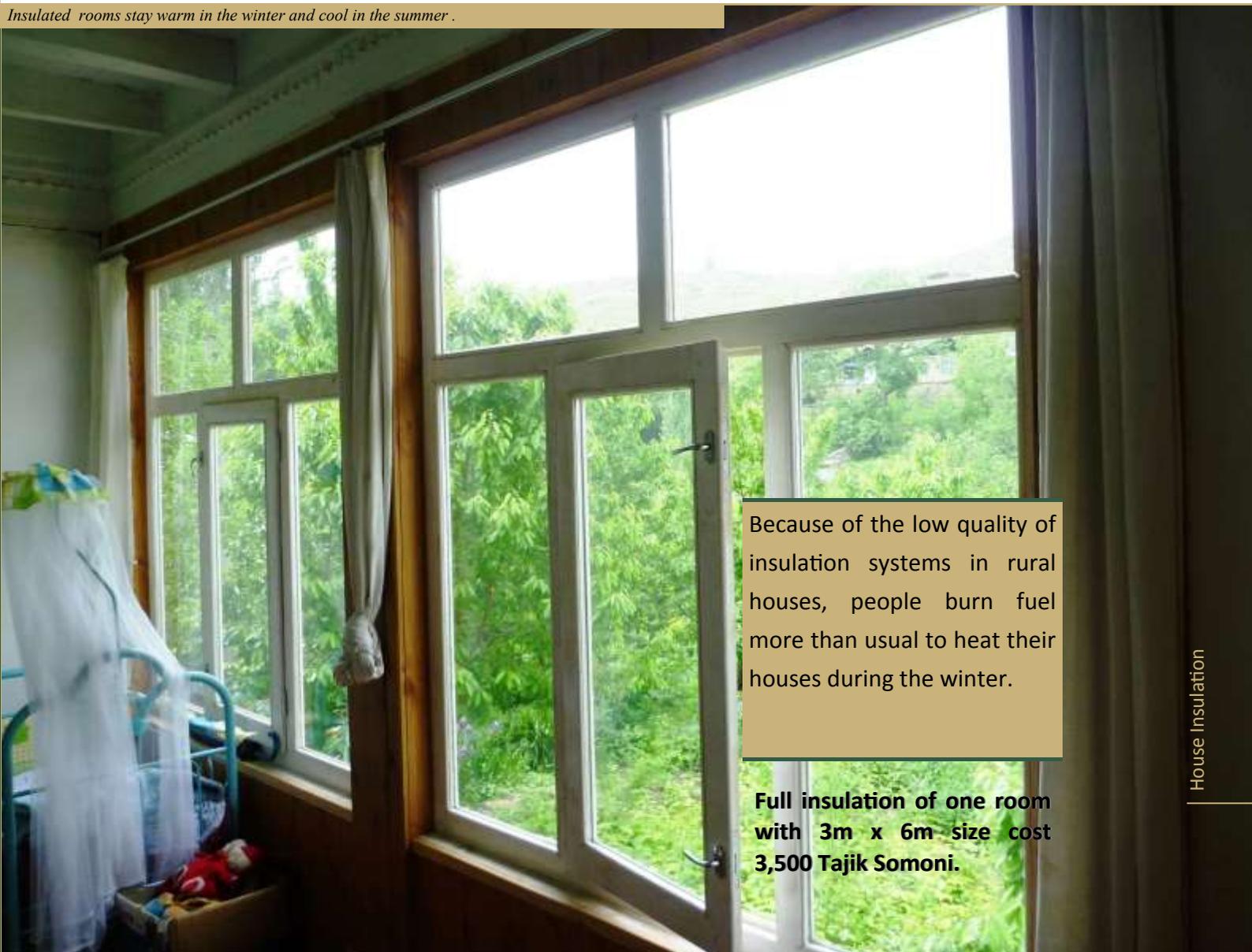
Qushinazar and Salima SAMIEVA
Residents of jamoat Oshoba, Asht district
User of passive solar house



HOUSE INSULATION

...is used for winter rooms to reduce the waste of fuel.

Insulated rooms stay warm in the winter and cool in the summer .



Because of the low quality of insulation systems in rural houses, people burn fuel more than usual to heat their houses during the winter.

Full insulation of one room with 3m x 6m size cost 3,500 Tajik Somoni.



By using house insulation technology, people can save up to 50% of their fuel to heat their houses.

If the heating season lasts 5 months, savings for just one

season can reach 6,500 kWh of energy or **2.3 cubic meters of wood** and/or **1 ton of charcoal**.



Styrofoam is a very good material for insulating the walls in winter houses.

For house insulation, please contact:

- Sirojiddin Ayomiddin at # 93-545-00-25, Dijik village, jamoat Fondaryo, Ayni district, and
- Ergashev Zokir at # 92-902-94-67, Upponi Bollo village, jamoat Oshoba, Asht district;

For a consultation and more information, please contact:

- Sirojiddinov Asliddin at # 92-764-20-52, jamoat Fondaryo, Ayni district, and
- Abdulloev Faizullo at # 92-727-06-51, jamoat Oshoba, Asht district.

To purchase the Insulated windows and doors, please contact:

- Kayumov Amonullo at # 93-437-77-77, Zarafshon 1 village, jamoat Fondaryo, Ayni district, and
- Odil Yuldoshev at # 92-839-11-40, Marhamat village, jamoat Oshoba, Asht district



Mahmudjon TOSHMATOV is a 63 year old resident of jamoat Oshoba, Asht district.

User of an insulated house.

“Although it’s been only four months since I insulated one room in my winter house, I already feel its tangible benefits. The main advantage of a heat insulated ceiling, walls, door, and windows, is using up to 40% less fuel. This because by heating the stove just once now we can keep the house warm throughout the night. Before we used to spend about 1600 TJS for fuel every year. Now, by reducing fuel consumption by 40%, we can save 600 TJS and still enjoy a warm house!”



The Improved « Vulkan » Stove - a way of saving fuel

IMPROVED STOVES “VULKAN”

...are used to heat rooms in the winter.



The efficiency of traditional stoves in rural households is very low. Increasing the Air temperature of rooms by 1°C requires a large amount of fuel with such stoves .

By using the “Vulkan” improved stove, you can use 40% less fuel to heat the room. If the heating season lasts 5 months, savings for just one season can reach 5,200 kWh of energy or **1.8 cubic meters of wood**, or **0.8 tons of charcoal**.

Extending the time of heat irradiation by using bricks



Up to 600 Tajik Somoni yearly saved with the utilization of Vulkan Stove

The price for 1 “Vulkan” improved stove is 900 Tajik Somoni

Capable of cooking various types of dishes



With the same heat, you can bake bread as well.

For more information and a consultation please contact:

- Sirojiddinov Asliddin at #92-764-20-52, jamoat Fondaryo, Ayni district
- Abdulloev Faizullo at # 92-727-06-51, jamoat Oshoba, Asht District



Shoir SOTIBOLDAEVA

44 year old resident of Jamoat Oshoba, Asht district.

User of Improved Stove "Vulkan" stove

“As a frequent user of the improved “Vulkan” stove, I advise other women to purchase this type of stove too. The “Vulkan” is very handy and convenient - not only for warming the house but also for baking and cooking.

For the past several months, we have been baking in this stove, which does not require burning additional amounts of wood. As I have observed, it saves 30-40% of my wood thanks to its improved combustion chamber. In addition, this winter we saved 40 bundles of firewood, which we usually burn for baking bread. In this stove, without using additional wood, we baked bread worth 120 - 160 somoni. The “Vulkan” stove helped us save 600 TJS from our average 1500 TJS annual fuel expenses.

To purchase the “Vulkan” improved stove , please contact:

- Halifaev Sharof at #92-738-76-76, Pinyon village, jamoat Fondaryo, Ayni district
- Isomatov Orifali at # 92-757-03-24, Marhamat village, jamoat Oshoba, Asht district

THE “TEZPAZ” STOVE

...is used for cooking meals in an outdoor kitchen, in a backyard, and in an indoor kitchen.

The “Tespaz” is the most efficient and convenient piece of cooking equipment



The “Tezpaz” is the most efficient and convenient piece of cooking equipment



The efficiency of traditional ovens in rural areas is low and requires more time and fuel for cooking.

By using the “Tezpaz” improved stove for cooking, you can save up to 50% on fuel. If the period of use is 7 months, once a day, you can save approximately 1 cubic meter of wood over the course of the year.

A combustion chamber with sides filled with insulation materials, such as “Agloportit” or “Keramzit”, makes stoves more efficient. These specific facilities keep the stove warm.

The price for 1 improved cooking stove “Tezpaz” is 320 Tajik Somoni.



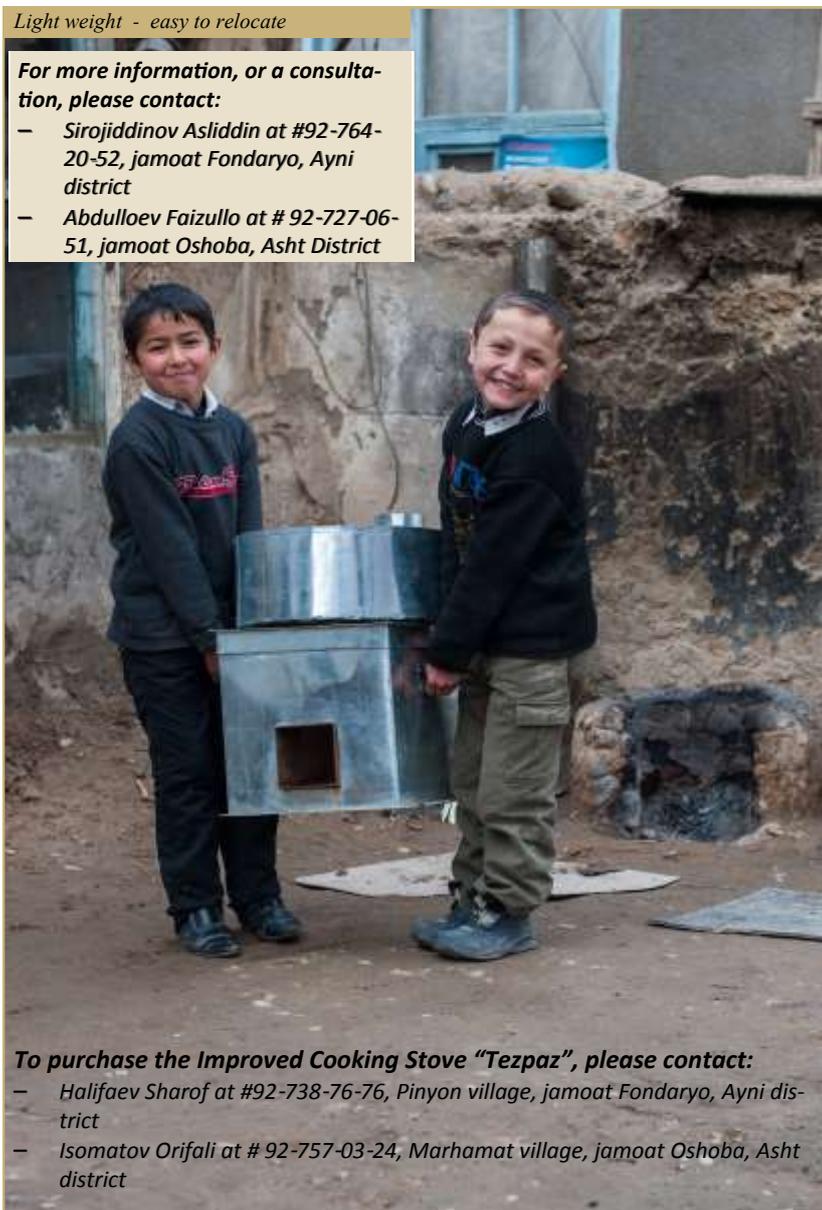
Stove pipe allows cooking without smoke



Light weight - easy to relocate

For more information, or a consultation, please contact:

- Sirojiddinov Asliddin at #92-764-20-52, jamoat Fondaryo, Ayni district
- Abdulloev Faizullo at # 92-727-06-51, jamoat Oshoba, Asht District



To purchase the Improved Cooking Stove “Tezpaz”, please contact:

- Halifaev Sharof at #92-738-76-76, Pinyon village, jamoat Fondaryo, Ayni district
- Isomatov Orifali at # 92-757-03-24, Marhamat village, jamoat Oshoba, Asht district



Gulsara RAHIMOVA

50 year old resident of jamoat Oshoba, Asht district

User of the “Tezpaz” Improved Cooking Stove

“I have been using the “Tezpaz” oven for almost one year and I already see the tangible benefits from using half as much wood as before and from myself being safe from poisonous smoke. With “Tezpaz” I saved 300 TJS which is 50% of our annual fuel expenditure.”

THE “NEPALI” STOVE

...is used for cooking meals in the outdoor kitchen in the yard.

The “Nepali” improved cooking stove reduces the use of wood





Using fire in a traditional oven

The efficiency of traditional ovens in rural areas is low and requires more time and fuel for cooking.



Using fire efficiently in the “Nepali” improved cooking stove



By using the “Nepali” stove for cooking, you can **save up to 20% of fuel.**

If the period of use of the stove reaches 7 months, once a day, you can save approximately 0.4 cubic meters of wood over one year.

Cooking in two pots at the same time on the “Nepali” stove.



The price for 1 “Nepali” improved cooking stove is 325 Tajik Somoni.

The above stated price includes prices for mud bricks and clay. Therefore, depending on accessibility of construction materials and fees, price may change.

The “Nepali” improved cooking stove is made from local materials.

For consultation and more information, please contact:

- Sirojiddinov Asliddin at #92-764-20-52, jamoat Fondaryo, Ayni district
- Abdulloev Faizullo at # 92-727-06-51, jamoat Oshoba, Asht District



Izzatmo BOQIEVA
 32 year old resident of jamot Fondaryo, Ayni district
 User of “Nepali” Stove

“In 2011, I replaced our traditional oven with the “Nepali” stove and I am very pleased with it. This is because this oven not only looks better but also cooks with lesser wood in shorter time. On top of it, it doesn’t smoke. For just 327 TJS of investment in this “Nepali” stove I was able to reduce our fuel consumption by 20% and save 120 TJS from the total amount spent on fuel.”

To purchase a “Nepali” improved cooking stove, please contact:

- Mirova Karomat at #92-759-95-72, Rabot village, jamoat Anzob, Ayni district
- Nazarova Kholbibi at # 92-704-31-23, Upponi bolo village, jamoat Oshoba, Asht district

THE MODIFIED STOVE

...is used for cooking meals in the outdoor kitchen in the yard.

The Modified stove differs from traditional ovens because of its low price and efficiency





Easy construction from local materials

By using the Modified stove for cooking, you can save up to **25% on fuel usage.**

If the period of use of the stove reaches 7 months, once a day, you can save approximately **0.5 cubic meters of wood over one year.**

Using fire efficiently with the Modified stove



The modified stove

The price for 1 Modified stove is 310 Tajik Somoni.

The above stated price includes costs for mud bricks and clay. Therefore, depending on the accessibility of construction materials and fees, prices may change.

Users enjoy smokeless cooking thanks to the door and the stovepipe



With the Modified stove, you can cook in two pots at the same time.

To purchase the Modified stove, please contact:

- Mirova Karmat at #92-759-95-72, Rabot village, jamoat Anzob, Ayni district
- Jumanov Jigitali at # 92-803-48-01, Marhamat village, jamoat Oshoba, Asht district

For consultation and more information, please contact:

- Sirojiddinov Asliddin at #92-764-20-52, jamoat Fondaryo, Ayni district
- Abdulloev Faizullo at # 92-727-06-51, jamoat Oshoba, Asht District

“Although the Modified stove looks traditional on the outside, its equipment is different in many ways. For example, while cooking, I can close its door so that I don’t waste heat or let the smoke out. The smoke goes out through the stovepipe. Construction of this type of oven is not difficult at all. My investment of 307 TJS has already paid off by saving 20% on fuel which is equivalent to 120 TJS.”

Subhia KHOLOVA

37 year old resident of Fondaryo jamoat, Ayni district

User of the Modified stove





Solar Greenhouses can be a good source of additional income for families

SOLAR GREENHOUSES

...are used throughout the year, including winter and early spring, to start growing vegetables early.

Solar greenhouse can be of two sizes:

- 10m x 5m and
 - 20m x 5m.
-

A special way of covering the roof of the greenhouse with mud and reeds keeps the inside of the greenhouse warm



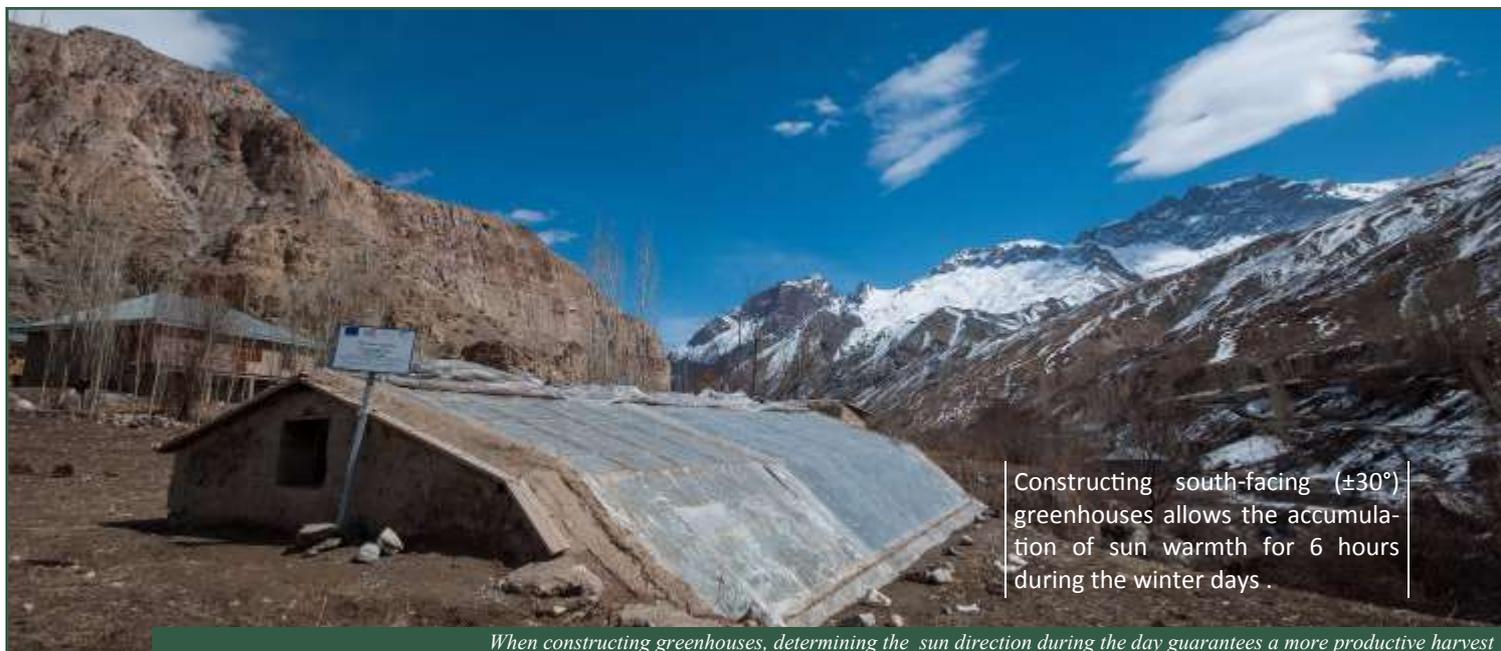
To reduce the loss of heat accumulated inside the greenhouse, the northern side of greenhouse roof is well insulated.

For heat insulation, you can use local materials and cover the roof with layers of:

- Reeds
- Plaster with clay (clay and hay)
- Tinplate (if needed)



Letting the clean air in through the ceiling windows.



Constructing south-facing ($\pm 30^\circ$) greenhouses allows the accumulation of sun warmth for 6 hours during the winter days .

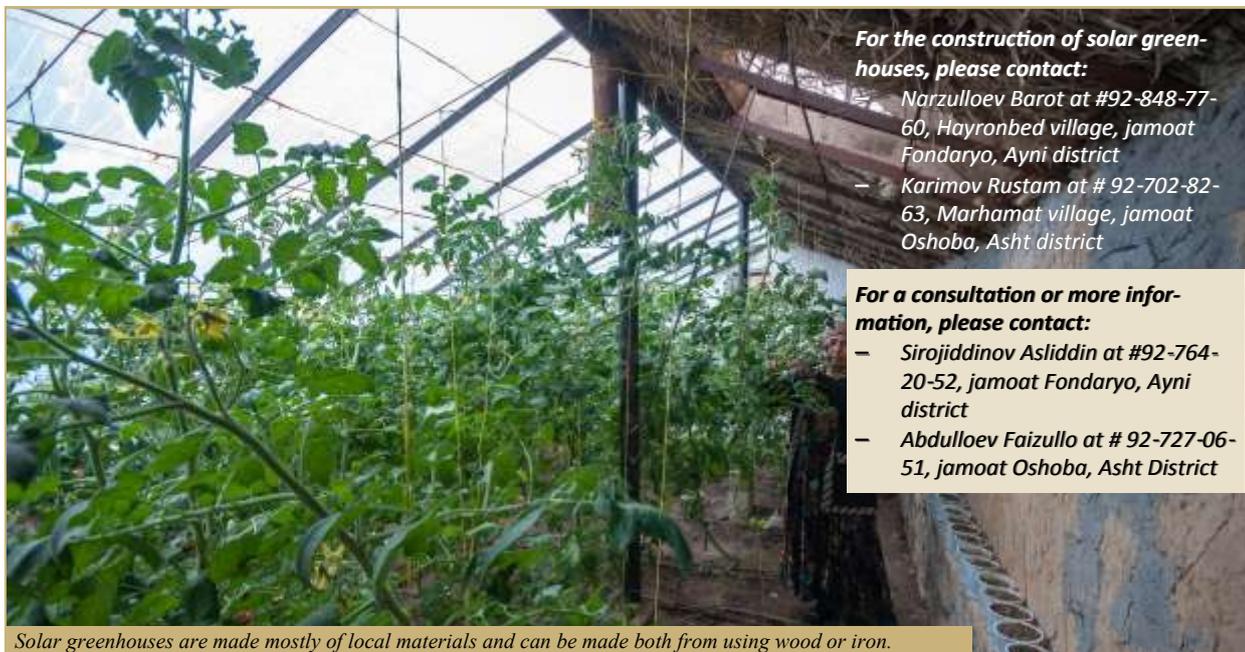
When constructing greenhouses, determining the sun direction during the day guarantees a more productive harvest

Cost estimate for construction of solar greenhouse

Expenditure	For size 10 m x 5m	For size 20 m x 5 m
Master's fee:	3325 TJS	5920 TJS
Construction materials:	9525 TJS	15720 TJS
Total:	12850 * TJS	21640 * TJS

** Price can be reduced depending on accessibility of construction materials and labor fees.*





For the construction of solar greenhouses, please contact:

- Narzulloev Barot at #92-848-77-60, Hayronbed village, jamoat Fondaryo, Ayni district
- Karimov Rustam at # 92-702-82-63, Marhamat village, jamoat Oshoba, Asht district

For a consultation or more information, please contact:

- Sirojiddinov Asliddin at #92-764-20-52, jamoat Fondaryo, Ayni district
- Abdulloev Faizullo at # 92-727-06-51, jamoat Oshoba, Asht District

Solar greenhouses are made mostly of local materials and can be made both from using wood or iron.



“ I worked with my family on our household plot, growing mainly crops that are grown during the warmer season of the year. Therefore, we harvest only in the summer and the early fall. But today we harvest all year round, thanks to the solar greenhouse, which was installed with the support of GERES, in 2011. I am one of the first residents in our village, who installed a solar greenhouse size 10m x 5m. During the first year, I grew tomatoes and cucumbers. As a result, I sold 70 kg of cucumbers and 130 kg of early tomatoes at the local market . This year, I began planting and selling tomato seedlings and later planted aromatics worth 600 Tajik Somoni. Over one year, I can make up to 2000 TJS of benefits. ”

Saltanat HAKIMOVA

33 year old resident of Fondaryo jamoat, Ayni District

User of a Solar Greenhouse

A special veranda covered with polyethylene plastic during the day collects warmth from the sun

SOLAR POULTRY FARMS

...are used to raise poultry
and produce chicken eggs in
the winter

Solar Poultry Farms come in
two sizes:
– for 130 chickens
– for 250 chickens



The walls of the solar poultry farm insulated with sawdust keep the warmth accumulated during the day throughout the night.



Traditional poultry farm

Well insulated solar poultry farms constructed facing south ($\pm 45^\circ$) do not require additional heating during the cold days of the winter and the chickens do not stop laying eggs during those days.

Cost estimate for the construction of a solar poultry farm

Expenditure	For 130 chickens	For 250 chickens
Master's fee:	5105 TJS	5549 TJS
Construction material:	10310 TJS	12464 TJS
Total:	15415*TJS	18013*TJS

** The price can be reduced depending on accessibility of construction materials and labor fees.*



For the construction of a solar poultry farm, determining the sun direction during the day guarantees successful breeding of chickens

Increasing the frequency of laying eggs in solar chicken coops without using heating systems



For a consultation or more information, please contact:

- Sirojiddinov Asliddin at #92-764-20-52, jamoat Fondaryo, Ayni district
- Abdulloev Faizullo at # 92-727-06-51, jamoat Oshoba, Asht District

For the construction of a solar poultry farm, please contact:

- Narzulloev Barot at #92-848-77-60, Hayronbed village, jamoat Fondaryo, Ayni district
- Karimov Rustam at # 92-702-82-63, Marhamat village, jamoat Oshoba, Asht district



Nargiza HOSHIMOVA

Resident of jamoat Oshoba, Asht district

User of a Solar Poultry Farm

“ My family started using a solar poultry farm with 200 chickens. As a result, we sold 90 roosters and we are now breeding 60 hens. We get 20-30 eggs on a daily basis that we sell on the same day. We hope to keep the same production rate during the winter to sell at the bazaar, where we will benefit from higher selling prices. ”

Bioclimatic cellars are one inexpensive, yet efficient solution for storing a harvest.

Bioclimatic cellars come in 3 sizes:

- For 4 tons of product
- For 7 tons of product
- For 20 tons of product

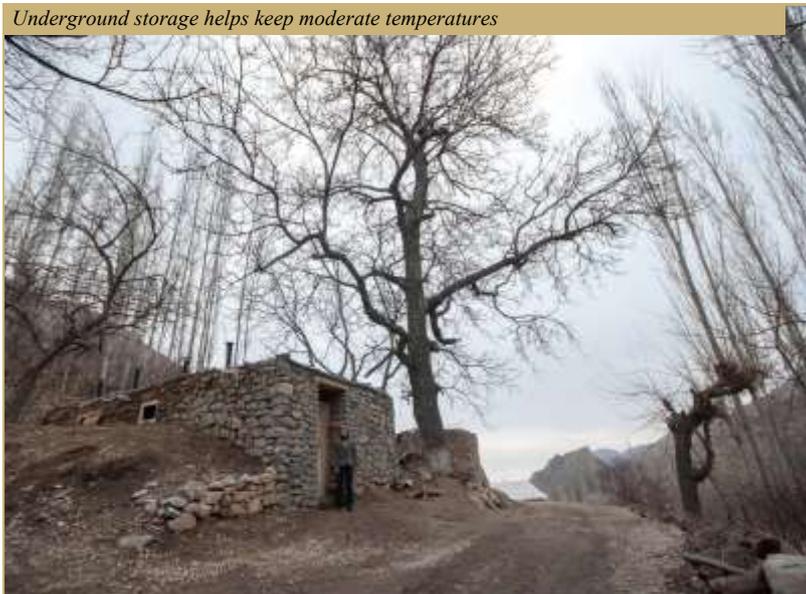
BIOCLIMATIC CELLARS

...are used for storing fresh fruit and vegetables for a longer time



Ventilation pipes provide air circulation

Underground storage helps keep moderate temperatures



Usually, during the harvest season, fruits and vegetables are sold for a price 50-60% lower than the one you can sell during the off-season. For example, 1 kg of apples during the harvest season is sold for 2 TJS. Then, during the off-season, its price goes up to 4-5TJS. Owners of bioclimatic cellars have the opportunity to double their revenue.



Making more space by installing shelves in the storage area.



In bioclimatic conditions, fruits and vegetables keep their freshness and flavor



Insulated ceilings protect crops from the cold

Cost estimate for construction of bioclimatic cellar

Expenditure	For 4 tons	For 10 tons	For 20 tons
Master's Fee:	4450 TJS	6270 TJS	8140 TJS
Construction Material:	8715 TJS	10960 TJS	13800 TJS
Total:	13165 TJS	17230 TJS	21940 TJS

* The price can be reduced depending on accessibility of construction materials and labor fees



For the construction of bioclimatic cellars, please contact:

- Narzulloev Barot at #92-848-77-60, Hayronbed village, jamoat Fondaryo, Ayni district
- Karimov Rustam at # 92-702-82-63, Marhamat village, jamoat Oshoba, Asht district

For a consultation or more information, please contact:

- Sirojiddinov Asliddin at #92-764-20-52, jamoat Fondaryo, Ayni district
- Abdulloev Faizullo at # 92-727-06-51, jamoat Oshoba, Asht District

Easy construction with no additional expenditure for maintenance

“ Before, through many difficulties, I used to store apples in the small space of an underground well. However, despite my hard work, I could store apples only till March. Even then, because of the strong effects of underground humidity, apples would lose their freshness and flavor.

Now, in my bioclimatic cellar, I store 2 tons of apples from November till May in excellent condition. The well designed floor and the walls protect the harvest from moisture and the ventilation pipes keep constant air moving, allowing the apples to stay fresh. If the price of an apple in harvest season is 2 TJS, now every week I sell 100 – 120 kg, for 3 TJS per kg. I thus increased my revenue by 30%.”

Muhtaram ATOBULLOEVA

Resident of jamoat Fondaryo , Asht district

User of a bioclimatic cellar



Bioclimatic Cellars

LOAN (CREDIT)

The micro financing institution "Arvand" offers loans for the construction and purchase of technologies.

Loan with collateral: a) Real estate b) movables, vehicle, jewellery

Energy efficiency technology					
Loan Products	Loan Amount	Loan Maturity	Interest rate %	Client	Commission
Green loan	15 000 TJS	12 months	2,5% monthly	all	*

Loan with collateral: Group Guarantee

Energy efficiency technology					
Loan Products	Loan Amount	Loan Maturity	Interest rate %	Client	Commission
Green loan	7 000 TJS	12 months	2,8% monthly	all	*

To get green loans for obtaining the above mentioned technologies, please contact:

MDO "Arvand"

Address: 1 "a" Lenin Street,
Khujand, Tajikistan

Phone: +992 92 795 00 01;
+992 342 4 00 79.

MDO "Arvand"

Address: 53 A Ismoili Somoni
Street

Shaidon, Asht district, Tajikistan
Phone: +992 92 700 77 76.

MDO "Arvand"

Address: Punuk city,
_Asht district, Tajikistan

Phone: +992 92 766 38 65



European Union



French Development Agency



*Women in Europe for
a Common Future*



German cooperation



*Deutsche Gesellschaft fuer
Internationale Zusammen-
arbeit (GIZ) GmbH*



UKAID



*Abbé Pierre
Foundation*



*Groupe Energies Renouvelables,
Environnement et Solidarités*



*Agency for Support Development
Process Nau*

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