



# **a**gricultural **b**iodiversity **C**ommunity

*Seventh Annual Meet*

*Theme:*

## **Regenerative Agriculture & Agricultural Biodiversity**

**Handbook**

*Venue:* International University of Chabahar (IUC), Iran

*Hosted by* IUC & CENESTA

**December 11-14, 2017**

*Hosted by*



**Cenesta**

*Funded by*

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## Regenerative Agriculture and Agricultural Biodiversity

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*Seventh Annual Meet of*  
**agricultural biodiversity Community**

**December 11-14, 2017**

Dear abc members!

Dear All,

Welcome to Chabahar, Iran!

We, ABC secretariat @ DHAN Foundation and CENESTA team extend our warm welcome to the 7th annual meet. We look forward to an exciting, engaging and enriching experience at the meet.

We have put together basic information in this handbook to make our meet and visit easier and fruitful. This handbook provides the background of abc and meetings organised so far, the schedule of 7<sup>th</sup> annual meet, a brief account about CENESTA - the host institution and the International University of Chabahar, and the field visit.

We hope this guide would help you explore and engage during our meet.

Our very best wishes for a comfortable stay and productive meeting!

abc Secretariat@DHAN Foundation  
CENESTA Team



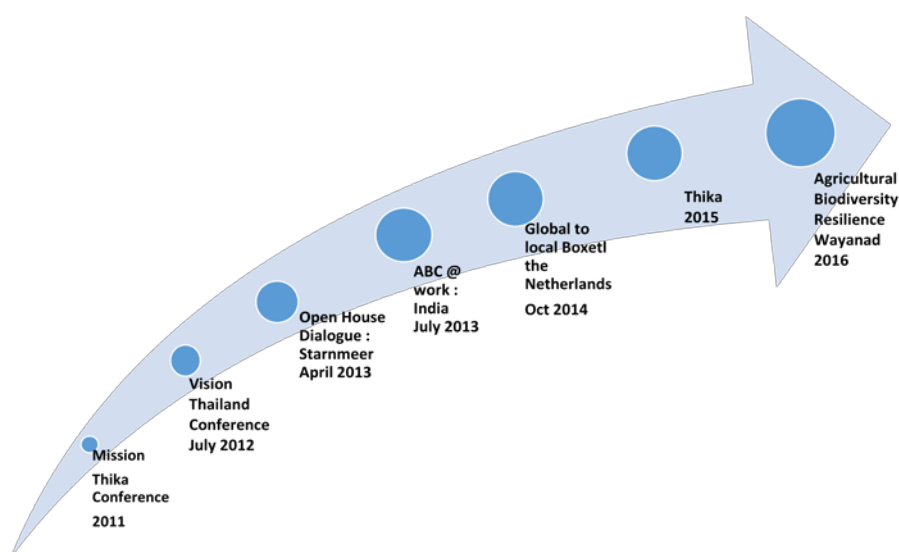
# Agricultural biodiversity Community (abc)

## Background

Agricultural Biodiversity Community(abc) was initiated as part of a joint HIVOS and Oxfam Novib Knowledge Programme, Agrobiodiversity@knowledged in 2011. This knowledge programme aimed to synthesize knowledge from a local to a global scale, conduct research on approaches and analytical frameworks that provide new perspectives on agricultural biodiversity and its role in resilient socio-ecological food systems, and improve horizontal and vertical knowledge flows towards positive change and transformation. abc was constituted by diverse organisations and individuals working on agricultural biodiversity with millions of farmers worldwide, where evidence and insights are generated, shared and tested. Abc members have developed the following shared vision and mission for guiding its activities:

**Vision:**The abc desires a world where agricultural biodiversity is conserved, carefully utilized and continuously developed; a world where smallholder farmers, pastoralist, fisher folk and forest dwellers (men and women) are enabled to contribute to, and benefit from, biodiversity-based resilient food production systems; a world where these people, the agricultural biodiversity they manage and their associated socio-ecological systems, are recognized, supported and strengthened and consumers have access to healthy produce coming from such farming systems.

**Mission:**The abc aims to break through the barriers that limit the scaling up, institutional embedding and horizontal extension of people-centered, agricultural-biodiversity-based food production systems.



## Journey of the abc

## Meetings so far...

- In the first meeting in 2011 held at Thika, Kenya established the state of knowledge around agricultural biodiversity. Identified knowledge gaps, common ground and support needed for the development of abc.
- In the second meeting in 2012 organised at Wongsanit Ashram, Thailand, strong foundations was laid by way of formulation of a shared vision and mission, identification of the five strategic themes for action and joint development of action plans to achieve goals of the community and created platform for communication.
- In the third meeting in 2013 organised in Madurai, India we have evolved tangible knowledge products relevant to abc and beyond and contributed to *Farming Matters Magazine*.
- The fourth meeting held at Boxtel, Netherlands in 2014 focused on creating momentum for change towards agricultural biodiversity at scale by strengthening abc to become a professional action-learning community. It worked towards advancing three themes namely resilience self-assessment, open source seed system, and influencing policy. Also, it focused on engaging with other stakeholders to identify blind spots, reflect and share experiences and perspectives.
- Again in Thika, Kenya abc organised its fifth meet in 2015, which focused on institutionalising abc and strengthening the member base.
- The sixth annual meet was organised in Wayanad, Kerala in India. Forty-seven participants including members of abc, representatives of farmers federations, practitioners attended the meet. Taking cues from the past meetings, the abc focused on the issues, challenges, opportunities and way forward in the context of climate resilience and agricultural biodiversity.

The proceedings of these annual meetings are shared in abc website

<http://www.agriculturalbiodiversitycommunity.org/>

## **7<sup>th</sup> Annual Meet: Regenerative Agriculture and Agricultural Biodiversity**

7<sup>th</sup> Annual Meet of abc is organised at International University of Chabahar, Iran and hosted by our member CENESTA. In addition to our regular process of reviewing our working mechanisms, contributions to further the cause of Agricultural Biodiversity, and planning for the coming year, the abc will focus on a specific theme to integrate into our action. The theme identified for the coming year is Regenerative Agriculture and Agricultural Biodiversity. The programme is organised between 11<sup>th</sup> and 14<sup>th</sup> of December 2017 with a lot of interactive processes.



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## **agricultural biodiversity Community (abc)**

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**Theme: Regenerative Agriculture and Agricultural Biodiversity**

***Seventh Annual Meet***

***Indicative Schedule***

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<b>Venue</b>	<b>: International University of Chabahar, Iran (hosted by CENESTA)</b>
<b>Dates</b>	<b>: 11<sup>th</sup> to 14<sup>th</sup> December 2017</b>

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### **Goals:**

- Taking on board the members of abc and committing collectively for taking abc forward.
- Facilitate exchange and learning on (local, national, regional and international) experiences and reflections on the theme of Regenerative Agriculture and Agricultural Biodiversity.
- Preparation of action plan for 2018.
- Learning about interesting and insightful agricultural biodiversity initiatives of CENESTA
- Advancing mechanisms of co-creation, skill exchange and communications to strengthen the agricultural biodiversity community.

## Agenda

### DAY 1

December 11, 2017

#### Visiting good practices fostering agricultural biodiversity

The first day of the meet is dedicated for visiting some of the good practices being carried out at the field by practitioners and the local farming communities to further agricultural biodiversity.

#### Time

07:00 a.m.	:	Leave for field visit
10:30 a.m.	:	Reaching the site / Interaction with the community
01:00 p.m.	:	Lunch
02:30 p.m.	:	Visiting village (Camel herding/handicrafts) Departing to the venue

#### Site

The field visit is organised in GhasrGhand near Chababar. Journey to this site will take about three hours from the meeting venue and all the participants will take part in the field visit. Arrangements have been made to meet the farmers in Ghasr Ghand and hold a short meeting with them. These farmers use a special system of wells (This ancient system is locally called *Qanat* in Iran) to provide water for their date palms and fruit orchards. The participants can visit the wells and learn more about their irrigations system. The biggest issue farmers' face in this region is the persistent drought that has endangered their cultivation. They use agriculture as a conservation method and it is part of their indigenous and local knowledge.

Subsequently the participants can have a quick visit to a village closer to *Ghasr Ghand* and learn about their camel herding and handicrafts. Lunch would be served at the site itself and the participants would return to the workshop venue.

#### Pointers for Reflection on Field Visit

- Good and next practices observed in the field and its relevance to agricultural biodiversity and regenerative farming.
- Learning drawn out of field visit and potential activities emerge as take away for integration and adaptation.
- Challenges for scaling up, replication and mainstreaming observed practices.

## Day 2

December 12, 2017

Time	Content	Facilitation
09.00	<b>Opening ceremony</b>	
09.30	Welcome address Opening remarks  Key Note Address       Vote of Thanks	<b>Ms MaedehSalimi</b> , CENESTA <b>M.P.Vasimalai</b> , Chairperson, abc Steering Council. <b>Mr Saedi</b> , Head of City Council of Chabahar, <b>Mr Kordi</b> , Deputy Director of Chabahar Free Zone Authority, <b>Mr Dejkam</b> , Head of Chabahar International University <b>Mr Darvish</b> , District Governor <b>Mr. Taghi Farvar</b> , Chair of the Board, CENESTA <b>Mr. Thomas Mupetesi</b> Member, abc Steering Council
11.00	<b>Health break</b>	
11.30	Introduction to abc and developments so far	<b>Ms. Maryleen Micheni</b> <i>abc Steering Council member</i>
11:45	Small group sharing of experiences related to agricultural biodiversity	Group Work (9 groups)
01:00	Sharing of Sub-groups	Rapporteurs from Groups
01:30	<b>Lunch</b>	
02:30	Updates of progress after the Wayanad, Kerala Meeting	R. Adhinarayanan, Secretariat, abc@DHAN Foundation
02:45	Working Groups 1. Seeds, Breeds and Technology 2. Resilient Communities 3. Markets and Trade 4. Policy 5. Communication	
04:00	<b>Health Break</b>	
04:30	Updates on • Co-creation • Skill Exchange	Institutions / members undertook these activities
06:30	Concluding Day 1	
Before & After Dinner	• Story Telling, Film Screening, Exhibition	



## Day 3

December 13, 2017

### *Theme Focus: Regenerative Agriculture and Agricultural Biodiversity*

09:30	<p><b>Agricultural biodiversity and Regenerative Agriculture</b></p> <p>Lead paper</p> <p>Panel discussion</p> <p>Theme Notes from Members</p> <ul style="list-style-type: none"> <li>• Michael Farrelly</li> <li>• Michael Commons</li> <li>• Maryleen</li> <li>• Sunil Lyanage</li> <li>• Frank Heckman (Video message/Skype)</li> </ul>	<p><b>Session Chair:</b></p> <p><b>Mr. Taghi Farvar</b>, Chair of the Board, CENESTA</p> <p><b>Co-chair: M.P.Vasimalai</b></p> <p>Representative from Regenerative Agriculture Network</p>
11:00	<b>Health Break</b>	
11:30	<p>Sub-group discussion on the theme - Regenerative Agriculture and connecting with the focal areas of agricultural biodiversity community, evolving action plan for 2018.</p> <ol style="list-style-type: none"> <li>a. Seeds, breeds and technology</li> <li>b. Markets and trade</li> <li>c. Policy and communication</li> </ol> <p>Plenary discussion</p>	
01:30	Lunch	
02:30	<p>Networking and Collaboration</p> <ul style="list-style-type: none"> <li>• AgriCultures Network</li> <li>• Regenerative Agriculture</li> </ul>	
04:30	Declarations and Way Forward	
05:30	Concluding Day 3	
Before and After Dinner	<ul style="list-style-type: none"> <li>• Story Telling</li> <li>• Film Screening</li> <li>• Exhibition</li> </ul>	

## Day 4

December 14, 2017

### Skill Exchange Workshop on Evolutionary Plant Breeding

#### *Agenda*

09:00 a.m	Reflections on Visit to Ghasr Ghand, Qanat SystemsBy members
10:00 a.m.	Workshop Evolutionary Plant Breeding (Details Awaited from CENESTA)
11:00 a.m.	Health Break
01:00 p.m.	Workshop Concludes
01:30 p.m.	Way Forward
01:30 p.m.	Lunch Break
3:30 p.m.	Steering Council Meeting
4:30 p.m.	Cultural Programme

# What is Regenerative Agriculture?

February 16, 2017

*“Regenerative Agriculture” describes farming and grazing practices that, among other benefits, reverse climate change by rebuilding soil organic matter and restoring degraded soil biodiversity – resulting in both carbon drawdown and improving the water cycle.*

Specifically, **Regenerative Agriculture** is a holistic land management practice that leverages the power of photosynthesis in plants to close the carbon cycle, and build soil health, crop resilience and nutrient density. Regenerative agriculture improves soil health, primarily through the practices that increase soil organic matter. This not only aids in increasing soil biota diversity and health, but increases biodiversity both above and below the soil surface, while increasing both water holding capacity and sequestering carbon at greater depths, thus drawing down climate-damaging levels of atmospheric CO<sub>2</sub>, and improving soil structure to reverse civilization-threatening human-caused soil loss. Research continues to reveal the damaging effects to soil from tillage, applications of agricultural chemicals and salt based fertilizers, and carbon mining. Regenerative Agriculture reverses this paradigm to build for the future.

## Regenerative Agricultural Practices are

Practices that (i) contribute to generating/building soils and soil fertility and health; (ii) increase water percolation, water retention, and clean and safe water runoff; (iii) increase biodiversity and ecosystem health and resiliency; and (iv) invert the carbon emissions of our current agriculture to one of remarkably significant carbon sequestration thereby cleansing the atmosphere of legacy levels of CO<sub>2</sub>.

## Practices include

1. No-till/minimum tillage. Tillage breaks up (pulverizes) soil aggregation and fungal communities while adding excess O<sub>2</sub> to the soil for increased respiration and CO<sub>2</sub> emission. It can be one of the most degrading agricultural practices, greatly increasing soil erosion and carbon loss. A secondary effect is soil capping and slaking that can plug soil spaces for percolation creating much more water runoff and soil loss. Conversely, no-till/minimum tillage, in conjunction with other regenerative practices, enhances soil aggregation, water infiltration and retention, and carbon sequestration. However, some soils benefit from interim ripping to break apart hardpans, which can increase root zones and yields and have the capacity to increase soil health and carbon sequestration. Certain low level chiseling may have similar positive effects.
2. Soil fertility is increased in regenerative systems biologically through application of cover crops, crop rotations, compost, and animal manures, which restore the plant/soil

microbiome to promote liberation, transfer, and cycling of essential soil nutrients. Artificial and synthetic fertilizers have created imbalances in the structure and function of microbial communities in soils, bypassing the natural biological acquisition of nutrients for the plants, creating a dependent agroecosystem and weaker, less resilient plants. Research has observed that application of synthetic and artificial fertilizers contribute to climate change through (i) the energy costs of production and transportation of the fertilizers, (ii) chemical breakdown and migration into water resources and the atmosphere; (iii) the distortion of soil microbial communities including the diminution of soil methanotrophs, and (iv) the accelerated decomposition of soil organic matter.

3. Building biological ecosystem diversity begins with inoculation of soils with composts or compost extracts to restore soil microbial community population, structure and functionality restoring soil system energy (C compounds as exudates) through full-time planting of multiple crop intercrop plantings, multispecies cover crops, and borders planted for bee habitat and other beneficial insects. This can include the highly successful push-pull systems. It is critical to change synthetic nutrient dependent monocultures, low-biodiversity and soil degrading practices.
4. Well-managed grazing practices stimulate improved plant growth, increased soil carbon deposits, and overall pasture and grazing land productivity while greatly increasing soil fertility, insect and plant biodiversity, and soil carbon sequestration. These practices not only improve ecological health, but also the health of the animal and human consumer through improved micro-nutrients availability and better dietary omega balances. Feed lots and confined animal feeding systems contributed dramatically to (i) unhealthy monoculture production systems, (ii) low nutrient density forage (iii) increased water pollution, (iv) antibiotic usage and resistance, and (v) CO<sub>2</sub> and methane emissions, all of which together yield broken and ecosystem-degrading food-production systems.

### **Co-Authors:**

***Regenerative Agriculture Initiative***, California State University, Chico

<http://www.csuchico.edu/sustainablefuture/aginitiative/>

***The Carbon Underground***

<https://thecarbonunderground.org/>

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This definition will continue to evolve as research and practice inform what builds the health of soils, sequesters carbon, and grows more topsoil for future generations.

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# Regenerative Agriculture

Regenerative agriculture is an approach to food and farming systems that regenerates topsoil and increases biodiversity now and long into the future. Regenerative Agriculture improves water cycles, enhances ecosystem services, increases resilience to climate fluctuation and strengthens the health and vitality of farming and ranching communities.

## Development and Influences

The current global practice of Regenerative Agriculture is based on applied and scientific research carried out by several international communities, including: organic farming, permaculture, agro-ecology, agro-forestry, restoration ecology, Keyline design and Holistic Management. There are several specific lineages of thought and practice that have contributed to Regenerative Agriculture.

In the 1980s, the Rodale Institute was the first organization to begin using the term 'Regenerative Agriculture'. Rodale Publishing formed the Regenerative Agriculture Association, which published books in 1987 and 1988. Robert Rodale, speaker at several conferences, says:

“By marching forward under the banner of sustainability we are, in effect, continuing to hamper ourselves by not accepting a challenging enough goal. I am not against the word sustainable, rather I favour regenerative agriculture.”

However, the Rodale Institute stopped using the term in the late 1980s, and it appears sparingly (in 2005 and 2008) until they released a white paper titled 'Regenerative Organic Agriculture and Climate Change' in 2014. A summary of the paper states, “Simply put, we could sequester more than 100% of current annual CO<sub>2</sub> emissions with a switch to widely available and inexpensive organic management practices, which we term 'regenerative organic agriculture’”. The agricultural practices described are crop rotation, compost application, and reduced tillage, very similar to most organic agriculture.

## 1990 Onwards: Modern Regenerative Agriculture

From 1990 to 2010, regenerative agriculture was most explicitly developed within the permaculture community. Influenced by the work of regenerative business pioneer Carol Sanford and the design and development work of Re-genesiS, the ecological systems approach of permaculture led to the expansion of regenerative agriculture to include whole farm design, multi-story agroforestry, and rotational livestock integration. In permaculture, a regenerative farm is one where biological production and ecological structure are growing

increasingly more complex over time, but yields continue to increase while external inputs decrease.

Especially important for coalescing a global community were the 2007-2009 workshops led by Darren J. Doherty ([www.Regrarians.org](http://www.Regrarians.org)) focused on Keyline® Design and Carbon Farming. The Carbon Farming Course, a series of workshops on Regenerative Agriculture held in 2009 and 2012, combined education on Holistic Management, Keyline Design Organic Agriculture, Soil FoodWeb, Biochar, Perennial Agriculture, and Agroforestry. The RegenAG Workshop series was also originated by Doherty and with local partners ran a series of 3 day workshops across Australia over 2010 and 2011. Farmers attending these workshops were funded by the Australian Government's Farm Ready Program. This series featured workshops on Holistic Management (with Kirk Gadzia), Keyline Farm Planning (with Darren J. Doherty), Bio fertile Farms (with Eugenio Gras) and Polyface Farming (with Joel Salatin). In 2011 Doherty took the RegenAG brand to the USA, Canada, Mexico, Chile, Spain, New Zealand and the UK. Since then organisations using this brand have continued to offer trainings in Regenerative Agriculture whilst others have rebranded but continue with delivering programs and advocacy.

## **Principles and Practices**

Regenerative Agriculture is guided by a set of principles and practices.

### **Principles**

Principles include:

- Increase soil fertility
- Work with wholes, not parts
- Progressively improve whole agro-ecosystems (soil, water, and biodiversity)
- Connect the farm to its larger agroecosystem and bioregion
- Create context-specific designs and make holistic decisions that express the essence of each farm
- Express the unique irreplaceable essence of each person, farm and place
- Make holistic decisions aimed at specific systems change
- Ensure and develop just and reciprocal relationships amongst all stakeholders
- Design for non-linear, multi-capital reciprocity
- Continually grow and evolve individuals, farms, and communities to express their innate potential
- Continually evolve agro-ecological processes and cultures
- Agriculture shifts the world

## Practices

Practices include:

- Permaculture Design
- Agroforestry
- Soil Food Web
- Properly Managed Livestock, Well-managed grazing, Animal Integration, and Holistically Managed Grazing
- STUN (Sheer, Total, and Utter Neglect) Breeding
- Keyline Sub-soiling
- No-Till Farming, minimum tillage, and Pasture Cropping
- Cover crops & multispecies cover crops
- Organic Annual Cropping and Crop rotations Compost, Compost Tea, animal manures, and Thermal Compost
- Poly-culture and full-time planting of multiple crop intercrop plantings
- Borders planted for bee habitat and other beneficial insects
- Biochar & Terra Preta
- Ecological Aquaculture
- Perennial Crops
- Silvopasture

*Source: Wikipedia*



## International University of Chabahar (IUC)

International University of Chabahar is a non-profit university which was established in 2002, with the approval of the Ministry of Science, Research and Technology, Islamic Republic of Iran.

To achieve its aims regarding training responsible, creative, professional, and productive students who respect Islamic values and human ideals, this university, besides enforcing high and outstanding academic standards, embarked on designing educational activities commensurate with the current conditions of the real world. The philosophy behind establishing this university is appreciating values and achieving objectives which can be delineated as the following: believing in research-based and knowledge-based university, providing Iranian students with a place for pursuing their education without being forced to leave Iran and study abroad, training well-educated and professional workforce to serve the country, and particularly free zones, preserving national culture in tandem with developing knowledge and personal skills, providing students with required educational and research services, planning for students to guarantee their success, strengthening educational links with higher education institutes at national and international level.

International University of Chabahar launched its first educational program at undergraduate level in collaboration with London University through external courses. Previously, the university was managed by London School of Economics and Political Science, Goldsmiths, and Royal Holloway. As university strategies altered and the university adopted a different policy, it started to admit students in 14 disciplines at undergraduate level and in 6 disciplines at graduate level.

At undergraduate level, students are admitted to the university by taking part in entrance examination (commonly-referred to as Konkur). In continuous undergraduate program, students are admitted in the following disciplines: civil engineering (civil branch), business administration, banking and finance management, computer engineering (Information Technology branch), economics (money and banking branch), English language and literature, architecture engineering, mining engineering, economics and management, computers and information systems, and industrial management. In discontinuous undergraduate program, students are admitted in executive civil engineering and elementary education disciplines.

At graduate level, students are admitted to the university by taking part in entrance examination of the following disciplines: land-use planning, executive management,



Information Technology (E-commerce branch), business administration, marketing, and civil engineering (structural engineering branch).

To extend its international academic links, International University of Chabahar, commensurate with its facilities and plans, strives to extend its academic links with prestigious universities at national and international level. In this regard, offering doctoral and master's degree program can be construed as addressing countries' academic needs. In the international University of Chabahar, all the courses are taught in English.

## **Strategic Plans of the University**

International University of Chabahar is distinctively positioned to achieve significant goals such as providing a place for fostering the creativity of our country's students, generating knowledge, education along with research, sharing and developing knowledge, and providing scientific services.

## **Core Values**

- Providing innovation in educational and research activities
- Respecting for ethic in the conduction of research with an emphasis on the great Islamic values
- Aligning the practical results of research with improving health in society
- being aligned with developmental plans and future perspectives
- establishing and developing Free education for other stakeholders in the community

## **Mission of International University of Chabahar**

- Promoting inter-university cooperation both with domestic and foreign universities in the fields of research and education.
- Setting up research and educational conferences, workshops, and seminars.
- Declaring scientific and international courses, conferences, and fairs and investigating foreign journals in this regard.
- Taking the required and necessary measures for sending faculty members to foreign universities to use scholarship.
- Providing the country and region with required professional workforce.
- Cooperating and interchanging information with other universities inside and outside of the country.
- Developing and realizing university's potentials.

## Goals

Defining goals paves the way for shedding light on the ways of achieving them. Major goals of International University of Chabahar from strategic, educational, and research point of view can be subsumed under the following rubrics:

### Goals falling under strategic and educational rubric

- Providing domestic and international students with premium educational and scientific services.
- Developing graduate studies and programs and increasing the number of applicants admitted to graduate programs.
- Providing educational requirements to set the scene for personal development.
- Establishing new disciplines in commensurate with the immediate and future needs of the society.
- Adopting and pursuing effective policies for identifying and attracting prospective students to the university.

### Goals falling under strategic and research rubric

- Establishing research centers and attracting research resources from the university.
- Cooperating with international educational and research networks and being the center of university's international research activities.
- Diversifying the topics taught in short-term courses.
- Commercializing and applying the results of research conducted in the university to the society.
- Conducting joint research activities and exchanging university professors and students with other countries.



The Centre for Sustainable Development (CENESTA) is a not-for-profit civil society organisation that struggles to re-empower indigenous peoples and local communities in Iran and beyond (including indigenous nomadic tribes and coastal and marine areas) by promoting and supporting appropriate recognition of indigenous peoples' and Community Conserved territories and Areas (ICCAs) that emphasis nature conservation, community rights and sustainable livelihoods. CENESTA also promotes democratising agro-ecological research. CENESTA is a member of UNINOMAD (Union of Indigenous Nomadic Tribes of Iran), ICCA Consortium, IUCN and Global Forest Coalition. It is accredited to the 3 Rio Multilateral Environmental Conventions.

### **Key Activities of CENESTA**

- Promoting the appropriate recognition of Indigenous peoples' and traditional Community Conserved territories and Areas
- Restoration of the rights of indigenous peoples and traditional local communities over their natural resources and territories, including facilitating the self-organisation of IPs and traditional communities through strengthening customary institutions of governance.
- Sustainable agriculture, food sovereignty and agro-ecology including: conservation farming, participatory plant breeding, evolutionary plant breeding, non-chemical management of pests and crop production, regenerative soil management, agroforestry, farming systems research, non-GMO advocacy, agro-fuels, social and environmental responsibility of agribusiness, local food systems, safeguards on industrial agriculture and animal husbandry, national seed laws and democratisation of food and agricultural research, land tenure rights;
- National and international policies and programmes for sustainable livelihoods and poverty eradication;
- Renewable energy (solar, wind, biomass technologies), including initiating major wind-farms and photovoltaic installations, as well as community based small scale application of biogas, solar heating and wind pumps;
- Collaborative management of natural resources, including wildlife and protected areas, as well as urban and industrial areas;
- Community-based natural resource management (common property and common pool natural resource management, promoting and safeguarding indigenous knowledge and strengthening customary institutions for management of watersheds, fisheries, water, pasture, forests, wildlife, etc.);

- Combating desertification (policy and practice on arid lands, pastoralism, climatic and vernacular architecture);
- Climate change adaptation, resilience and mitigation, especially community-based;
- Environmental, social and health impact assessment

## **Globally Important Ingenious Agricultural Heritage Systems (GIAHS)**

Globally Important Ingenious Agricultural Heritage Systems (GIAHS) and their associated landscapes have been created, shaped, maintained and passed on by generations of farmers, herders, forest dwellers and fish folk.

Based on diverse species and their interactions and using locally adapted distinctive and often ingenious combinations of management practices and techniques they have contributed and continue to contribute tremendously to the agricultural biodiversity and the natural and cultural heritage of the world.

- Qanat Irrigation System is an ancient water distribution system allowing specialised and diverse cropping in desert regions of Iran.
- Kariz, an eternal friendly technology for harvesting ground water.

Read more about Globally Important Ingenious Agricultural Heritage Systems (GIAHS) initiative of CENESTA @<http://www.cenesta.org/en/2015/10/04/globally-important-ingenious-agricultural-heritage-systems-giahs/>

## **Supporting Agro-biodiversity Maintenance and Use in the Context of Land Management Decisions**

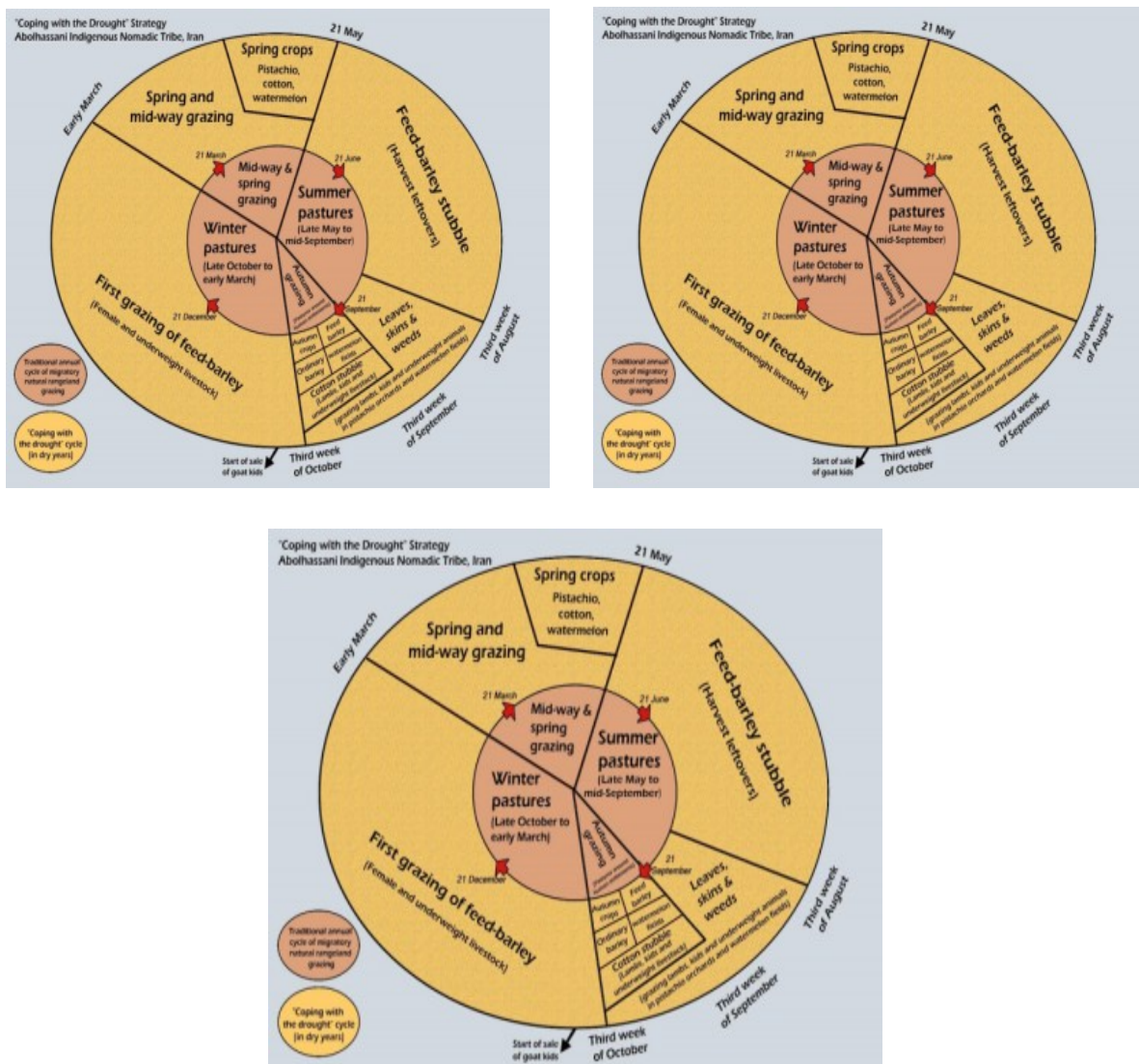
*The Platform for Agrobiodiversity Research* project funded by The Christensen Fund focuses on the Abolhassani Tribal Confederacy in Iran. This Project aims at developing a framework for assessing the effects of land use change on agro-biodiversity and building the evidence base for land-use strategies that favour the maintenance and use of agro-biodiversity. The framework integrates different agro-biodiversity measures to support the analysis of the consequences of land use decisions on agro-biodiversity, ecosystem services and resilience. This project follows the methodology of

- Participatory mapping – based on a methodology developed by Natalia Estrada Carmona, Bioversity International
- Resilience assessment
- Household survey

## Coping with drought

The predominant activity conducted by the Abolhassani people is pastoralism. Sheep and goat are the main types of livestock they raise. Livestock is the main source of Abolhassanis' livelihoods but in recent years, the frequent and long drought periods is making pastoralists' livelihoods increasingly difficult and have caused some detrimental impacts, e.g. decreased livestock and agricultural productions, water shortage, decreased fodder and loss of rangeland vegetation cover.

Because the Abolhassani community live in a particularly challenging dry and increasingly drought-prone environment, there is little they can do to mitigate the causes of climate change. Their efforts have therefore concentrated on community action for adaptation to climate change. The ingenuity of this initiative is that this community has ended up gathering the totality of their own innovations in one logical strategy they have called "Coping with the Drought Cycle", which is presented in the figure below, based on their own hand-drawn charts and information.



The water supply has been redesigned and optimized thanks to the restoration of **Qanats**, to digging open storage tanks and cisterns, and the use of the **hanar system**, aiming at water security.

**Hanar system:** Watering the animals once every two days instead of everyday during the cooler autumn and winter seasons. It saves water and allows the animals to go twice as far without needing to be watered, thereby relieving pressure on natural range due to better distribution of grazing. The revival of the hanar system has also facilitated sharing available water sources effectively between livestock and wildlife, as the former are watered around mid-day, while wildlife get to these watering points at daybreak and sunset.

The map of their territory shows that most of the area is still in rangeland, and that a careful analysis has helped them enhance their pastoralist activities, by anticipating carefully both fodder and grazing needs of their herds in each season, harvesting the feed from their reinvented agriculture at the right time and saving part of the harvest in case of extreme meteorological events.

Finally, the strategy also revitalises the natural resources used in traditional seasonal migration. The reinvention of the entire agricultural system not only has permitted restoring the ecosystems on a regional scale but has also helped supply critically needed fodder exactly when the natural vegetation needs a respite from grazing, and when wildlife are in need of their turn to use these same resources.

Read more about CENESTA @ <http://www.cenesta.org/en/>

## **About Sistan and Baluchistan**

Sistan and Baluchistan is located in the southeast of Iran and, covering an area of 187502 square kilometers, is construed as the largest province of Iran. In fact, it covers about 11 percent of Iran. Given that Sistan and Baluchistan is located in a strategic and transit area, it plays a pivotal role in Iran's economy. Most specifically, Chabahar port is Iran's sole oceanport and is the best ways for having access to Middle-East countries and open waters. Although Sistan and Baluchistan is characterized by having hot and dry climate, it experiences particular regional climatic variations. Besides, this vast province accommodates mountainous areas, marshes, and forests. Zahedan is the capital of this province which has been connected to Quetta in Pakistan for a century with a broad gauge railway.

The entire borders of this province are 1580.2 square kilometers; thus, it constitutes one-sixth of Iran's total borders. Sistan and Baluchistan shares borders with Afghanistan which extends for almost 288.5 square kilometers (one-third of Iran- Afghanistan entire border). Furthermore, Sistan Baluchistan and Pakistan borders form the entire of 921.7 square kilometers of Iran-Pakistan border. The length of Sistan and Baluchistan water border with the Gulf of Oman is 370 square kilometres

## **About Chabahar**

Chabahar, covering an area of 17150 square kilometers, is located in the southern part of Sistan and Baluchistan province of Iran and the distance between this city and the capital of the province is 756 square kilometers. Given its closeness to the tropic of cancer and Gulf of Oman, Chabahar enjoys year-round temperate climate. Its borders are with Sarbaz and Nikshahr to the north, with Jask (in Hormozgan province) to the west, with the Gulf of Oman to the south, and with Pakistan to the east.

The city and port of Chabahar is located in the south-eastern part of the country. In fact, it lies at the eastern edge of the Gulf of Oman. Biris, Guatr, Pasabandar, Ramin, big Oraki, and Abkan, being adjacent to the Gulf of Oman and open waters of the Indian Ocean, are among the villages that attract tourists. The location gulf in this port along with the presence of deep waters and natural rifts have set the scene for having deep berths and a good harbor for the mooring of ocean liners. Thus, this port is capable of becoming a megaport. To put it differently, Chabahar can be conceived of as a transit gate in the eastern part of Iran or as a strategic area for the development of transit industry in Iran.

Other coastal regions in the south of Iran and even countries situated at the edge of Persian Gulf are not characterized by such distinctive features. Accordingly, viewed from national interests' perspective, Chabahar is of paramount importance in that, in conducting business

transactions, exploiting Chabahar's potentials opens up avenues for reinforcing economic relations with neighboring and Middle-East countries. Finally, drawing on natural resources of the region paves the way for achieving lofty goals such as eradication of poverty, development and prosperity, economic growth and development, presence in global markets, generating employment, exports of industrial products and providing public services (Article I of the Act on Administration of free trade areas - IRAN)

## **Chabahar Free Zone**

### **Chabahar Free Trade-Industrial Zone**

Chabahar Free Trade-Industrial Zone, constituting one of Iran's seven free trade-industrial zones, was established in the vicinity of Chabahar, the Oman Gulf, and the Indian Ocean to pursue Iran's economic goals.

Through land and air transport networks, this region is connected to Afghanistan and central-Asian countries in the north, to Pakistan in the east, and to the Indian Ocean in the south. Direct access to high seas, being located outside the Persian Gulf, and not being vulnerable during crisis have created a strategic position for the establishment of a gateway between Iran and Central Asian countries.

In Chabahar Free Trade-Industrial Zone, some advantages have been offered such as 15-year exemption from income and asset tax and customs, trade, and investment benefits. Apart from the mentioned advantages, Chabahar free trade-industrial zone offers the following advantages too:

- Providing the shortest and the most secure route for central Asian independent states (CIS) and Afghanistan to have access to high seas (According to the United Nation, Chabahar is one of the most important ways of the east-west corridor and is the southmost ways of this corridor).
- Being connected to land and mother country. Thus, unlike Kish and Qeshm, the need of paying loading and unloading costs is obviated.
- Having two important commercial ports namely ShahidBeheshti and Shahid Kalantari with up to 70000 tones capacity.
- Having access to international airport of Kenarak and connecting roads.
- Having higher education institutions
- Being away from the tense Persian Gulf region and direct connection with the Indian Ocean.
- Offering extensive and appropriate facilities required for trading and investment.
- Having year-round temperate climate.
- Having natural and historical attractions.



## **University Campus**

International University of Chabahar, with a total area of 461 hectares, accommodates the office of academic affairs, administrative buildings, dormitories, departments, green space, etc. The beautiful landscape of campus provides students with a peaceful and joyful environment. Proximity to sea, shopping centers, and clinic can be envisaged as the advantages of the International University of Chabahar. By updating the existing hardwares, setting its long-term objectives (establishing departments with highest academic standards and providing region's students with up-to-date knowledge), and embarking on recruitment of knowledgeable faculty members, the International University of Chabahar strives to serve as a turning point in the production and application of knowledge.

Training professional and well-educated workforce for our country, particularly, free zones, attempting to plan for students' success, providing students with academic services, and strengthening educational links with higher education institutes at national and international level can be construed as the philosophy behind establishing this university.

## **About Chabahar City ([www.toiran.com/en/city-chabahar](http://www.toiran.com/en/city-chabahar))**

Chabahar in Sistan-Baluchestan Province is a strategic city near the waters of the Sea of Oman and the Indian Ocean and the closest way for the land-locked countries of Central Asia to reach international waters. Chabahar borders Iranshahr and Nik Shahr in the north, the sea of Oman in the south, Pakistan in the east and Kerman and Hormozgan Provinces in the west.

Chabahar has mild tropical climate with hot, humid summers and warm weather winters. It is considered the warmest place in Iran during the winter and the coolest port in southern Iran during the summer.

The city's name is believed to originate from the words 'Chah' meaning water well and 'Bar' meaning surrounding area as in the past the people of the city dug wells to meet their drinking water needs and thus those living around the well were living in Chabahar. Others believe because there is minimum change in temperature in this city and it always has spring (bahar) climate the city is called Chabahar meaning four springs.

Based on Tis Village, the history of the area is believed to date back to at least 2,500 years ago. The area was known as Tiz at the time of Alexander of Macedonia's attack on the Persian Empire and it continued to be a thriving trade center until the Mongol attack in the 13th century when it was ruined. In the 16th century Chabahar and Tis fell under Portuguese occupation.

Some of the historical attractions of Chabahar include the Baluch Gat Fortress, Portages Fortress and the Parthian Piruz or Pirouz Gat Fortress.

One of the main attractions of Chabahar is Gwadar Bay where the Hara Forests are located and where the extremely rare mugger crocodile also known as Gando lives.

Considered the country's biggest port and a designated Free Trade-Industrial Zone, the 'U' shaped Port Chabahar attracts many birdwatchers and scuba diving enthusiasts.

## Venue

The conference will take place at:

International University of Chabahar

Address: Behesht Terrace, Chabahar free economic-industrial zone, Chabahar

Phone: +98 (54) 353 14301

Email: info@iuc.ac.ir

International University of Chabahar is a non-profit university, which was established in 2002, with the approval of the Ministry Of Science, Research and Technology.

To achieve its aims regarding training responsible, creative, professional, and productive students who respect Islamic values and human ideals, this university, besides enforcing high and outstanding academic standards, embarked on designing educational activities commensurate with the current conditions of the real world. The philosophy behind establishing this university is appreciating values and achieving objectives which can be delineated as the following: believing in research-based and knowledge-based university, providing Iranian students with a place for pursuing their education without being forced to leave Iran and study abroad, training well-educated and professional workforce to serve the country, and particularly free zones, preserving national culture in tandem with developing knowledge and personal skills, providing students with required educational and research services, planning for students to guarantee their success, strengthening educational links with higher education institutes at national and international level.



## Accommodation

Participants will stay at the residence of the university. There will be shuttle service between meeting venue and the residence in the morning and evening. Every two persons will stay in one room. Please bring your Towels and bed sheets with you.

## Meals

All meals will be prepared with local and seasonal ingredients as much as possible and served at the University of Chabahar. We will try our best to provide participants with vegetarian and non-vegetarian food.

## Expenses

Cenesta and IUC cover costs for participants during the conference in Iran for accommodation, meals and local transport between the airport, venue and hotel.

## Money

The currency of Iran is the Rial (symbolized as IRR). Other currencies are normally not accepted, so be sure to change money at the airport. Since the foreign credit/debit cards are not acceptable in Iran, bring money in cash for any personal expenses during your stay.

## Electricity

Electricity is 220V-240V, 50 Hz. Types of plugs used:



## Weather

The weather varies in different areas of Iran. In Tehran, during December the temperature falls between average high of 8.6° and average low of 1.0° of Celsius. In Chabahar during December, average temperature would be between 26.3° and 16.2° of Celsius, and average relative humidity would be 61 percent.

## Smoking and Drinking

Smoking is banned in public areas in Iran. No alcohol is allowed within Iranian territory.

## Dress Code

### Dress Code for Men

Men dressing is the same as male dressing all around the world, but it is better not to wear short trousers

### Dress Code for Women

The most common uniform consists of a headscarf (Roo-sari) to conceal the head and neck, a formless, knee-length coat known as a Roo-poosh and a long dress or pair of pants. In and around holy sites, you will be expected to dress even more modestly in a chador, a full-length swathe of black cloth designed to cloak everything but your face from view.



### **From Airport to the Venue and Back**

For travel from the Imam Khomeini International Airport to Mehrabad Airport, Cenesta will arrange airport transfers. For traveling from Chabahar airport to the university, the university staff will arrange airport transfer. In case you have to reach Mehrabad Airport by yourself, you can take taxi there. The taxi fare would be about 19-21 US dollars.

On-arrival visa is only issued at IKIA (Imam Khomeini International Airport). More information about on-arrival visa can be found here:

<http://www.irantravelingcenter.com/iran-visa-on-arrival/>

Mehrabad Airport is 34 kilometers far from IKIA and it takes a 46 minute – 1:30 hour (depend on traffic) trip to reach the Mehrabad Airport by taxi.

All the international flights to Tehran land on IKIA. Most domestic flights from Tehran to other destinations in Iran, fly from Mehrabad Airport.

Mehrabad Airport Terminals and Airlines

- Terminal 1 (for outbound and arrival flights): Kish Air, Zagros
- Terminal 2 (for outbound and arrival flights): Ata, Qeshm Air, Meraj, Iran Air, Iran Air Tours
- Terminal 4 (for Outbound flights): Aseman, Mahan Air, Taban, Caspian, Atrak
- Terminal 6 (for Arrival flights): Aseman, Mahan Air, Taban, Caspian, Atrak

**If you missed your flight, are delayed or cannot find the meeting point, contact Cenesta people. Contacts info are in contacts section at the end of this document.**

### **Communication**

Iranian SIM cards are sold in the airports and shops in cities. Hamrah-e Aval, Irancell and Rightel are the biggest mobile operators in Iran. Internet and calling fees are somewhat cheap in Iran.

2G, 3G and 4G networks are supported in Iran.

## Police

If you are victim of crime, go to one of the police stations or inform any uniformed police officer. They will take a statement and provide you with useful telephone numbers and addresses. The Iran is generally very safe. In case of emergency, you can call the police on 110.

## Iran's Popular Destinations (Tourism)

Shiraz, Isfahan, Yazd, Kerman, Tabriz and Mash'had are the most popular destinations among tourists in Iran. For more information: <http://tourismiran.ir/en/>

## Medical Assistance

If you require any medical assistance during your stay, please ask any of the team for help. In case of emergency, you can call an ambulance on 115.

## Contacts

### Emergency

- Police: 110
- Ambulance: 115
- Fire: 125

### Airports

Mehrabad International Airport: 199

IKIA: 9633

### Cenesta People

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- Dr Taghi Farvar: +98 (912) 176 4908 [taghi@cenesta.org](mailto:taghi@cenesta.org)

## Field Visit

The field visit is organised in GhasrGhand near Chabahar. Journey to this site will take about three hours from the meeting venue and all the participants will take part in the field visit. Arrangements have been made to meet the farmers in Ghasr Ghand and hold a short meeting with them. These farmers use a special system of wells (This ancient system is locally called *Qanat* in Iran) to provide water for their date palms and fruit orchards. The participants can visit the wells and learn more about their irrigations system. The biggest issue farmers' face in this region is the persistent drought that has endangered their cultivation. They use agriculture as a conservation method and it is part of their indigenous and local knowledge.

Subsequently the participants can have a quick visit to a village closer to *Ghasr Ghand* and learn about their camel herding and handicrafts. Lunch would be served at the site itself and the participants would return to the workshop venue.

### Pointers for Reflection on Field Visit

- Good and next practices observed in the field and its relevance to agricultural biodiversity and regenerative farming.
- Learning drawn out of field visit and potential activities emerge as take away for integration and adaptation.
- Challenges for scaling up, replication and mainstreaming observed practices.

### An overview of the Field Visit Site

Sistan and Baluchistan Province has a lengthy boundary with Pakistan and Afghanistan and consists of two parts, the Sistan region, which is located in the north of the province; and the Baluchistan region, which is situated in the south. Ghasr-e-Ghand is located in the Baluchistan region.

Most of the rural population can be characterized as pastoralist and agro-pastoralist, with a rising cohort of sedentary agriculturists colonizing the valley floors in the province's uplands and one major canal colony in the eastern lowlands. Groundwater is vital to agro-pastoralist and sedentary agriculture, and for more than a millennium the linchpin of groundwater tapping technology in Balochistan has been the *Qanat* system.

The *qanat* system consists of a network of underground canals that transport water from aquifers in highlands to the surface at lower levels by gravity. This ingenious technology — known as *falaj* in Oman, *khattara* or *foggara* in North Africa, *karez* or *kanerjing* in the northwestern desert of China, and *karez* in Afghanistan, Pakistan and Central Asia — continues to provide reliable supply of water for human settlements and irrigation in hot, arid and semi-arid climates. In fact, *qanat* technology exists in more than 34 countries. In Iran alone, there are an estimated 50,000 *qanats*, nearly three-quarters of which are still working.

# Water and Agriculture Scenario in Iran

## Qanat

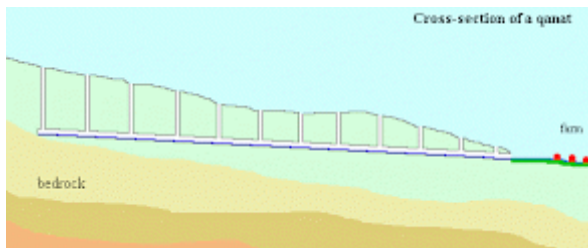


The outlet of a qanat

*Qanat* is a type of underground irrigation canal between an aquifer on the piedmont to a garden on an arid plain. The word is Arabic, but the system is best known from Iran.

To make a qanat, one needs a source of water, which may be a real well, but can also be an underground reservoir (e.g., a cave with a lake) or a water-bearing geological layer, which can be recognized as a damp area in an otherwise arid region. When one has identified this source, a tunnel is cut to the farm or village that needs the water.

Shafts are added for three reasons: as air supply, to remove sand and dirt, and to prevent the tunnels from becoming dangerously long. The shafts are not very far apart, and as a result, a qanat seen from the air gives the impression of a long, straight line of holes in the ground - as if the land has been subjected to a bombing run.



Cross-section of a qanat

Typically, the qanat becomes a ditch near its destination; in other words, the water is brought to the surface by leading it out of the slope. In fact, one creates an artificial artesian well and an oasis.

As the ceramics of the farms at the exit of a qanat offer an indication of its age, it is possible to date qanats. The technology became popular at the turn of the Bronze/Iron Age, about 1000 B.C.E., but is considerably older.



Anshan: a Qanat seen from the air

Being about  $1\frac{1}{2}$  meter high and  $\frac{3}{4}$  meter wide, qanats are rather narrow, but they can reach depths of 30 meters (the record seems to be 60) and can cover distances of many kilometers (the longest Iranian qanat is said to be 70 kilometers long.) The trick is to make the angle of the qanat not too steep, because in that case, the water will grind itself down into the bottom and create pools that will make the qanat collapse; on the other hand, if the angle is not steep enough, the water will be tainted. Everything depends, therefore, on the correct angle. The diggers or *muqannis* were brilliant surveyors.

A qanat, once built, can exist for a long time, but agriculture with qanats is extremely labor-intensive. Not only is it difficult to dig an underground canal, but it also needs a visit every spring to clean it out. Usually, this work is left to boys, whose fathers are standing near the shaft and pull up buckets and can come to their children's rescue when the gallery collapses.

During the White Revolution of the late shah, Iran's great estates were broken up and the land was given to those who actually worked it. An unintended result was that it was no longer clear who was responsible for the maintenance of the qanats, and many fell into disrepair. At the same time, several qanats



**View inside a qanat**

were replaced by underground canals made of concrete, which needed less maintenance and

were cheaper. This process has accelerated during the last quarter of a century, but at least 20,000 qanats are still in use, and even those that no longer carry water are still useful - if only as traps for little animals.

Throughout the arid regions of Iran, agricultural and permanent settlements are supported by the ancient qanat system of tapping alluvial aquifers at the heads of valleys and conducting the water along underground tunnels by gravity, often over many kilometres. The traditional communal management system still in place allows equitable and sustainable water sharing and distribution. The qanats provide exceptional testimony to cultural traditions and civilizations in desert areas with an arid climate.

The Persian Qanat system is an exceptional testimony to the tradition of providing water to arid regions to support settlements. The technological and communal achievements of the qanats play a vital role of qanat in the formation of various civilisations. It's crucial importance for the larger arid region is expressed in the name of the desert plateau of Iran which is called "Qanat Civilisation". Dispersion of primary settlements on alluvial fans of the inner plateau and deserts of Iran is immediately related with the distribution pattern of qanat system across the country. The system also presents an exceptional living cultural tradition of communal management of water resources.

The Persian Qanat system is an outstanding example of a technological ensemble illustrating significant stages in the history of human occupation of arid and semi-arid regions. Based on complex calculations and exceptional architectural qualities, water was collected and transported by mere gravity over long distances and these transport systems were maintained over centuries and, at times, millennia. The qanat system enabled settlements and agriculture but also inspired the creation of a desert-specific style of



architecture and landscape involving not only the qanats themselves, but their associated structures, such as water reservoirs, mills, irrigation systems, and gardens.

### **Farming with Qanat**

Qanats have sustained food and livelihood security over millennia by providing reliable source of water to traditional family farms in most dry areas where agriculture and farming would be impossible otherwise. By making it possible for humans, plants and animals to survive in the harshest climatic conditions, Qanats have supported important biodiversity particularly ancient varieties of pomegranate, figs, pistachio, apples, apricots, and other fruits and vegetables, medicinal plants as well as many livestock breeds. Ingenious water distribution and management systems as well as social and cultural practices have allowed the development of the most ancient agricultural civilizations in Iran, Central Asia, China and elsewhere around the world. The community participatory water management schemes have brought cohesiveness, solidarity and strong sense of fraternity to the local communities. It is an efficient system that optimizes water use, providing quality water and crop diversity.

### **Geography**

The Islamic Republic of Iran covers a total area of about 1.75 million km<sup>2</sup>. The country is bordered by Armenia, Azerbaijan, the Caspian Sea and Turkmenistan to the north, Afghanistan and Pakistan to the east, the Gulf of Oman, the Strait of Hormuz and the Persian Gulf to the south, and Iraq and Turkey to the west. About 52 percent of the country consists of mountains and deserts and some 16 percent of the country has an elevation of more than 2 000 m above sea level. The largest mountain massif is that of the Zagros, which runs from the northwest of the country southwards first to the shores of the Persian Gulf and then continues eastwards till the most south eastern province. Other mountain ranges run from the northwest to the east along the southern edge of the Caspian Sea. Finally, there are several scattered mountain chains along the eastern frontier of the country. The Central or Interior Plateau is located in between these mountain chains and covers over 50 percent of the country. It is partly covered by a remarkable salt swamp (kavir) and partly by areas of loose sand or stones with stretches of better land near the foothills of the surrounding mountains.

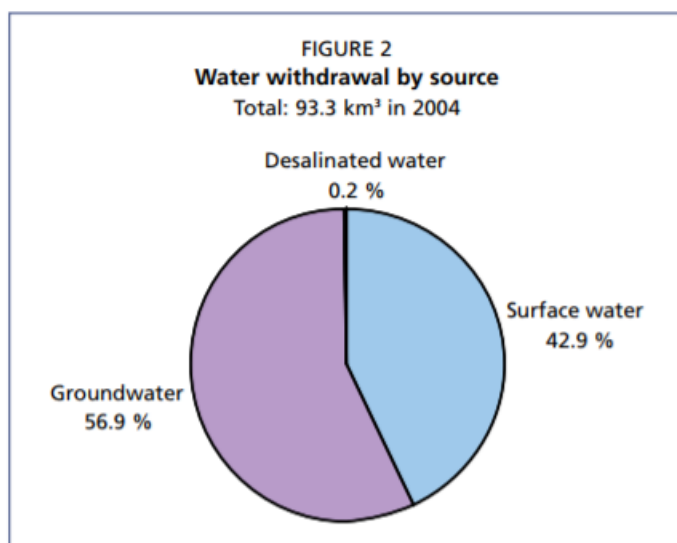
The cultivable area is estimated at about 51 million ha, which is 29 percent of the total area. In 2005 18.1 million ha were cultivated. Of this area, 16.5 million ha consisted of annual crops and 1.6 million ha of permanent crops (Table 1). In 2003, 72.5 percent of the landholders cultivated less than 5 ha, 22.5 percent between 5 and 20 ha, and only 5 percent more than 20 ha.

## Climate

The climate of the Islamic Republic of Iran is one of great extremes due to its geographic location and varied topography. The summer is extremely hot with temperatures in the interior rising possibly higher than anywhere else in the world; certainly over 55 °C has been recorded. In winter, however, the great altitude of much of the country and its continental situation result in far lower temperatures than one would expect to find in a country in such low latitudes. Minus Temperatures of -30 °C can be recorded in the northwest and -20 °C is common in many places. Annual rainfall ranges from less than 50 mm in the deserts to 2 275 mm in Rasht near the Caspian Sea. The average annual rainfall is 228 mm and approximately 90 percent of the country is arid or semi-arid. About 23 percent of the rain falls in spring, 4 percent in summer, 23 percent in autumn and 50 percent in winter.

## Agriculture

In 2007 the Gross Domestic Product (GDP) was US\$270.9 billion (Table 1). Agriculture accounted for around 9 percent of GDP, while in 1992 it accounted for 23 percent. The economically active population is about 27.6 million (2005) of which 70 percent is male and 30 percent female. In agriculture, 6.7 million inhabitants are economically active of which 56 percent male and 44 percent female. Agriculture is mostly practiced on small farming units. From 1960 to 1993 the number of farming units increased from 1.8 to 2.8 million units, with the average area per unit decreasing from just over 6 ha to less than 5.5 ha. More than 80 percent of these farming units have a total size of less than 10 ha and even these 10 ha are on average scattered over five different locations. About 5 percent of the agricultural land is used by cooperative companies, consisting of both traditional and modern systems. Usually each cooperative has 8 members with an average size of 40 ha. Commercial companies cover



around 14 percent of the agricultural land, mostly located in Khuzestan province in the southwest of the country.

Role of irrigation in agricultural production, the economy and society  
About 98.5 percent of the agricultural land in the Islamic Republic of Iran is under private ownership. Rainfed cultivation is possible in the higher rainfall areas in the northwest, the west and in the littoral zone along the

Caspian Sea. About 89 percent of the total agricultural products in the last 5 years have come from the irrigated land. The total harvested irrigated cropped area was 8 592 554 ha in

2003 (Table 5 and Figure 8). By far the most important harvested irrigated crop is wheat (almost 31 percent of the total harvested irrigated area), followed by fodder (10 percent), groundnuts (7.5 percent), rice (7 percent), barley (7 percent) and vegetables (6.5 percent). Wheat is also by far the most important rainfed crop. In 2003, around 40 percent of the area under wheat was irrigated and 60 percent rainfed. In 1993 the yield for irrigated wheat was estimated at 2.78 tonnes/ha against 0.95 tonnes/ha for rainfed wheat. Crop yields on irrigated land, although generally 2–3 times higher than on rainfed land, are still on the low side by international standards. Water shortage and soil salinity are mentioned among the main causes of this yield gap (Smedema, 2003). Irrigation efficiency is generally low, 33 percent on average at national level. This causes waterlogging and salinisation in the irrigated areas, which are major problems in the Islamic Republic of Iran.

**Source:**

Websites of

- Food and Agriculture Organisation (FAO)
- UNESCO
- Middle East Institute

