

Chapter 15

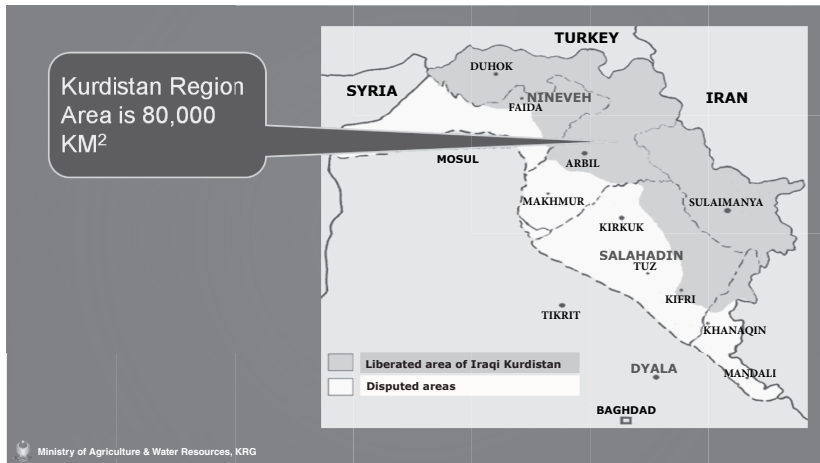
Agriculture and Water Resources in the Kurdistan Region of Iraq

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The Kurdistan Region was the birthplace of humanity and civilization, where the earliest people fled to for the mountains and wildlife. The village Charmo in the Chamchamal district is evidence of this fact, and it is considered the first agricultural village in the world and the most ancient agricultural habitation in the new Stone Age. Between 1948–1955, professor Brid Wood from the East Institute of SAM languages and Arts at Chicago University found between 25 and 30 mud houses and stone homes created with the remnants of the bones of animals, goats, pig, deer, and other animals. He also found grains, like wheat and barley, in those houses and especially in the graves. The history of the village dates back to around 10,000 years BC, showing that the peoples living in this area worked on agriculture, but later settled in other places.

After the 1950s, several Iraqi regimes were responsible for the demolition of 4,500 villages (of the total 5,131) villages in the KRI, the confiscation of the villagers' lands, the burning of forests and orchards, leading to a significant decrease in agricultural workers. This was an important reason leading to the collapse of the agricultural sector in the KRI, which ultimately led to a decline in self-sufficiency, instead relying on agricultural imports.

As a countering measure, the Kurdistan Regional Government (KRG) started to create a strategy in 2006 to begin implementing a five-year plan in 2009 with the participation of other sectors, such as water resource, trade, and food industries. With only 9.2 percent of the budget secured, the government was unable to implement all its goals. However, certain products, such as wheat and potatoes, now cover more than 100 percent of the KRI's need, while others agricultural products (e.g., tomatoes, cucumbers, eggs, among others) cover more than 54 percent, while others barely reach 40 percent of the population's needs. However, the average supply for these products has increased by around 15 percent and now covers between 30–45 percent local consumption. The KRG Ministry of Agriculture and Water Resources (MOAWR) suggested a new five-year plan for 2015–2019, which unfortunately was not implemented due to budgetary

Figure 1. Kurdistan Region Map

Source: (Web) /Resolution unknown

reasons. The financial crisis following the war against ISIS, the global fall in oil prices, and the Iraqi central government's cut off of the KRI's budget share, prevented the implementation of the plan. In fact, the financial crisis gravely affected the agricultural sector, especially in terms of farmer subsidies. In this regard, the ministry of agriculture and water resources took this opportunity to take advantage of the financial crisis to help offset the hardship of those who lost their source of income with agricultural activities; many of those who lost their jobs moved to the countryside to work in the agriculture sector, increasing agricultural employment from 16 percent to 20 percent¹ and also led to the increase in product supply.

The Current Reality of the Agriculture Sector and Water Resources

The diverse geography and climate of the Kurdistan Region make it extremely suitable for agriculture. The KRI consists of wide plains (stretching for about 924,000 hectares) and mountains, and its climate is suitable for multiple agricultural products, with a mixture of tropical, mild and cool climates with plenty of rainfall.

¹ Reports of agricultural sub-offices in the KRI.

Figure 2. The KRI's Agricultural Land Size in Hectares

Cultivable Land	Rain-fed	1,208,366
	Irrigated	327,428
Forrest	Handmade	14,436
	Natural	1,249,853
Horticulture	Vegetable Irrigated	297,029
	orchard Rain fed	35,082
	orchard Irrigated	30,399
Rangeland		1,734,443
Total		4,569,608

Around 99 percent of agricultural land is owned by the Ministry of Finance and Economy, and 1 percent is privately owned.

The 99 percent that is government-owned is distributed as follows:

- Around 21 percent has been giving to farmers and the farmer hold all legal rights.
- Around 44 percent is given to farmers through renting contracts. In 2008, the law of ownership was enacted in parliament and the process is still ongoing (the right of ownership will be given to contractors).
- Around 35 percent is still not settled. In 2007, the law on land was enacted in parliament (Determination of the title to agricultural land) will be given to their owners.

Categories of Agricultural lands and producing capacity

There are eight categories of agricultural lands in Kurdistan Region²:

- Category (1): considered the finest type of land, suitable for planting all types of crops: grains, vegetables, and fruit. Around 0.6 percent of the land (which equals 1.6 percent of the agricultural land) falls under this type.
- Category (2): considered fine land, suitable for planting most types of field crops.
- Category (3) considered medium arable land, suitable for planting grains. It comprises about 20 percent of the land (which equals 58.4 percent of the agricultural land) falls under this type.

² Reports and data of general directorate of agricultural lands in Kurdistan region.

- Category (4): this land has a limited use for agriculture; around 13 percent of the land (which equals 40 percent of the agricultural land) falls under this category.
- Category (5-6-7): not suitable for agriculture, only suitable for rangeland and forestry (e.g., planting olive trees and other forest trees). Around 55 percent of the KRI's land falls under this category.
- Category (8): rocky land, municipal places, villages, roads, industrial, and commercial lands. This category considers public interest areas and covers about 10 percent of land.

Principles of Managing the Agricultural land policy

In spite of Management of Agricultural land needs to be organized by a special law, it also needs a clear and comprehensive law in order to avoid loss and not underestimate its capabilities as:

- a. The categories (1, 2, 3 and 4) have their own special importance for agriculture and food safety and it may not be used for the purpose of construction or institutions, or for other non-agricultural purposes, except in cases of extreme necessity.
- b. Prevent the fragmentation of agricultural land, and implementing the text of Article (4) of the law No. (1) in 2008 which regulates the right of ownership of agricultural properties that determined the economic feasibility.
- c. Try to find large units and large agricultural fields to protect the land from partition.
- d. Taking the environment into consideration within the programs and plans of protection and management of agricultural land such as the management of soil erosion and floods, groundwater protection, dams, etc.
- e. Revival of Finance strategy so as to prevent the use of agricultural land for other purposes.
- f. Activating programs and policies for the protection of agricultural lands and implementing them in the best performance with technical and financial support by the government for the purpose of obtaining the best results.

Table 1. Poultry projects

Governorate	Erbil	Sulaimaniya	Dohuk	Gariman	Total
Meat Poultry	426	445	220	104	1,195
Table/ unfertilized Eggs	7	1	1	1	10
Laying Hens	11	3	--	--	14
NAZHAD?	1	--	--	--	1
Hens for meat and laying hens	19	7	5	1	32
Slaughterhouse	4	2	1	--	7
Fodder production companies	13	3	2	2	20
Total	481	461	229	108	1,279

Table 2. Number of Sheep, Goats, Cows and Buffalo

Governorate	Sheep	Goat	Cow	Buffalo	Total
Erbil	793,000	507,000	65,000	0	1,365,000
Sulaimaniya	1,054,412	354,805	138,008	620	1,547,845
Dohuk	776,323	273,223	47,863	0	1,097,409
Garmian	489,141	88,921	6,128	2,500	586,690
Total	3,112,876	1,223,949	256,999	3,120	4,596,944

Table 3. Animal meat

Governorate	Dairy Cow Project	Sheep and Goat Project	Raising Calf Projects	Raising Lamb Project	Total
Erbil	29	19	22	--	70
Sulaimaniya	15	5	8	--	28
Dohuk	13	40	5	4	62
Garmian	1	--	1	1	3
Total	58	64	36	5	163

Table 4. Fish

Governorate	Fish Nursery, Breeding Fish	Fish Farms, Meat Production
Erbil	1	189
Sulaimaniya	1	109
Dohuk	1	43
Garmian	1	56
Total	4	397

Table 5. Level of plant and animal production in 2016 ;

Food type	Capacity in 2016/ ton	IKR requirement in 2019/ton	Rate of self sufficiency
Wheat	1,686,784	931,453	181%
Poultry meat	99,738	148,411	67%
Table eggs	15,400	48,000	32%
Red meat	76,500	89,419	80%
Milk	260,000	509,194	51%
Vegetables	637,177	745,162	85%
Fruits	54,316	310,484	17%
Fish meat	4,730	18,008	26%

Source: Annual report of ministry of agriculture and water resources in Kurdistan region, 2016.

Table 6. Investment under ministry's law (2007–15)

Projects	Notes	Unit	Capacity	Numbers
Dairy project	For farmers	Head	7,022	58
fattening Calves	For farmers	Head	6,395	40
Breeding Sheep and goat	For farmers	Head	17,257	69
Lamb fattening	For farmers	Head	2,560	6
Orchards	For farmers	Hectare	3750	1250
Olive for oil	For farmers	Hectare	1500	800
Irrigation Systems for planting wheat	For farmers	Hectare	18750	2198
Green houses for veg.	For farmers	Green house	9696	650
Total				5071

Table 7. Other Investments under Investment law (2007–15) in numbers :

Projects type	Numbers	Notes
Dairy project	7	1 competed & operating
Poultry & Eggs projects	7	Four operating
Wood project	1	Not started
Olive for oil	4	1 completed
Green houses for veg.	6	1 project completed & operating
Mushroom	3	1 completed
Agro fair	1	Completed
Ostrich	1	Completed
Total	30	10 competed & operating

Agriculture and Water Sector Roadmap (2015–19)

The mission of the Ministry of Agriculture and Water Resources for the next five-year plan (2015–19) is food and water sufficiency for the KRI. All projects and objectives are designed to serve this goal according to the available human and financial resources for each objective. An annual population growth rate of 3 per cent is estimated, with this estimation the population of the KRI will increase from 5,356,531 to 6,209,688 by 2019. The projected food and water needs are based on the estimated population of the KRI in 2019 and take into consideration the daily prescribed intake of calories, between 2,800–3,200 calories.

The food and water reserves in 2014 serve as the baseline for these projections; in addition, we conducted an analysis for the agriculture and water reality in KRI, and the risks that these two sectors might face.

The policy plans for the next phase of the agriculture and water sectors have been outlined in the roadmap. These goals include proper rules and regulations, under the guidance of the MOAWR.

The goal is to 1) increase local production by 20 percent, 2) increase water storage capacity by 3.9 percent, 3) increase irrigated lands by 4.1 percent, 4) increase green spaces by 0.5 percent, 5) decrease diseases and infectious diseases by 80 percent and 30 percent respectively, 6) apply modern marketing systems, decrease override on agricultural lands by 80 percent, and increasing agricultural investment by 3 percent.

To ensure the success of this plan, teams for the follow-up and evaluation of staff performance and projects are to be formed on the KRI level as well as within each province.

Obstacles and Risks

The following issues should be addressed in order to apply the right solution at the right time:

Obstacles and Barriers

1. Insufficient financial resources allocated to the agriculture and water sector, which needs 10 percent of the KRI's budget for the reconstruction phase. The current budget allocates a mere 4 percent to these sectors

Table 8. Individual needs from foods

Food Type	Unit	Amount needed per capita	KRI requirement in 2019/ton	Standards
Wheat	Kg/Yr.	150	931,453	73.7
Chicken meat	Kg/Yr.	23.9	148,411	
65				
Red meat	Kg/Yr.	14.4	89,419	
Fish	Kg/Yr.	2.9	18,008	
Lentil and Chickpeas	Kg/Yr.	12	74,516	
Vegetables	Kg/Yr.	120	745,162	106
Fruits	Kg/Yr.	50	310,484	65
Eggs	Eggs/Yr.	150	931,45 Million	180
Cooking Oil	L/Yr.	15	93,145	15.4
Milk	L/Yr.	82	509,194	176
Honey (Beekeeping)	L/Yr.	0.24	1,490	---

Table 9. Individual and sectors demand from water

Purpose	Per capita needs	The KRI's needs in 2019/ million m ³	Source
Drinking water and daily use	200 L/Individual/Day*	453.3	The Ministry of Municipalities and Tourism
Agriculture irrigation 1,556,000 Donums	1 L/Hectare/Second* one season	6139.0	UNAMI: Water Resource Management 2010
Water usage for livestock	8 L/small animals/day	16	The Ministry of Agriculture and Water sector
	30 L/big animals/Day	5.1	
	0.2 L/Poultry/Day		
	1 Donum/Fish Farm/ Fish* 2500 m3 * 3 times annually	4.95	
Water usage by industries	4,600 L/ Factory/day * 5000 Factories* 280 working days per year	6.44	The Ministry of Trade and Industry
Others, parks, tourist sites, construction	Average	400	---
The KRI's total requirements for 1 year		7024.79	

2. The KRG does not consider agriculture and water to be priorities; rather, it focuses on oil and gas
3. The lack of legislation regulating water management and maintenance is one of the main reasons behind the misuse of water, water contamination, and trespassing of water resources, irrigation projects, and river shores
4. Lack of robust cooperation with universities, common in developed countries

Risks

1. Leaving Iraqi borders wide open for illegitimate and illegal imports has had a negative impact on KRI's agricultural products
Digging deep wells for underground water extraction in large numbers has dropped the level of underground water by more than 30 meters
2. The overtaking of agricultural lands by the municipalities. So far, 1,651,199 of the best agricultural lands have been retaken, and attached by various municipalities, who have replaced the lands with concrete buildings. The continuation of this situation will eventually lead to the total destruction of agriculture in the KRI, and puts a massive burden on the KRG when it comes to the provision of services for these vast areas—services such as water, electricity, roads, schools, police stations, and so on
3. Production requirements are imported, such as fodder, manure/fertilizers, seeds, medicines, vaccines, and so on.
4. Lack of a scientific system for marketing farmers' products and application of old methods.
5. Rangelands are on the verge of annihilation due to unplanned grazing and drought.
6. Wildlife is under threat of extinction. Their protection is not planned and scattered among different ministries and authorities.
7. Due to an increase in investment projects, forests have come under threat

Objectives and Strategic Goals

The five-year plan is comprised of eight objectives, further subcategorized with strategic goals.

1) Increase and reform agricultural products, vegetables, and meat production

1. Produce 1,220,000 tons of wheat annually
2. Produce 345,000 tons of barley and 33,950 tons of corn annually
3. Produce 17,195 tons of chickpeas, 6,700 tons of lentil and 5,495 tons of sunflower seeds annually
4. Produce 664,300 tons of various vegetables annually
5. Produce 245,287 tons of various fruit annually
6. Produce 140,000 tons of chicken meat annually
7. Produce 93,500 tons of red meat annually
8. Produce 4,204 tons of fish annually
9. Produce 1,750 million eggs annually
10. Produce 494,000 tons of milk annually
11. Produce 1,094.5 tons of honey annually

2) Ensure a water storage capacity of 10,500 billion m³ and irrigation of 390,440 acres of agricultural land.

1. Increase storage capacity to 10.5 billion m³.
2. Irrigate cultivated lands reaching 390,440 acres.

3) Supporting Research and Development; upgrade the scientific level and vocational skills of employees, and strengthening research centers

1. Develop and achieving new types of products in regards to the productivity and resistance to diseases and drought
3. Increase and improve animal and poultry products
4. Research on agricultural diseases and pesticides
5. Strengthening capacity building, capability of science, experience of extension's and ministry's staff.
6. Reduce the use of pesticides and applying IPM, i.e. Integrated Pest Management.

4) Increasing and Developing Forests and Rangelands

Table 10. The situation of agricultural researches and extension centers

Topic	Number on KRI level	Notes
Research Centers	4	
extension centers	43	

Table 11. Technical Staff of the MOAWR

Degree	Number on KRI level	Notes
Ph. D	9	
Master's Degree	194	
Bachelor's degree in agriculture	1,375	
Bachelor's degree in Engineering and Geology	544	
Bachelor's degree in Administration, Accounting, and Statistics	77	
Bachelor's degree in Veterinary	520	
Association's degree from Technical institutions	1,625	
Total	4,344	

5) Reforms in agricultural services and agricultural banking

Goal No. 1: providing sufficient services to the farmers via modern technology, accredited true seeds, and supporting marketing

Goal No. 2: Connecting weather forecast networks to production and predicting agricultural diseases. Processing data on weather, rain, winds, and temperature to obtain information and provide access to farmers with this information online.

Goal No. 3: Selecting the proper seeds and plants for the KRI's soil and weather, including working on the production map and directing support toward investing the right products in the right soil.

Goal No. 4: Connecting support to productive farmers with productive economic criteria and providing encouragement and support to farmers in order to establish associations and cooperation among themselves as well as with small- and medium-sized farm owners, with the purpose of unifying all capacities.

Goal No. 5: Expanding agricultural banking services to include all production and marketing processes, raising the limit of loans to one billion

dinars, continuing to keep banks open for farmers throughout the year, and easing the terms and conditions of lending to the farmers.

6) *Protecting animals' health in order to provide healthy food to citizens*

1. Controlling and preventing the spread of cross-border diseases and transmittable diseases
2. Conducting needed tests on livestock, poultry, and fish
3. Upgrading the performance of the Central Veterinary Diagnostic Lab (CVDL)

7) *Reforms in agricultural products' marketing system*

1. Provision of support for the establishment of marketing associations and companies
2. Proposing laws and instructions on marketing for regulating relations between farmers with traders, buyers and consumers under the oversee of the MOAWR, and proposing a special law on encouraging the export of agricultural products
3. Establishing marketing information systems
4. Supporting the establishment of associations for producers of red meat, chicken meat, fish and dairy products

8) *Sustainable management of agricultural land*

1. Revision of governing laws
2. Providing a well-trained staff for departments of real estate and properties
3. Acknowledging agricultural land as a national resource, and removing obstacles ahead of agricultural lands
4. Proper lands allocation for investment in agriculture

Conclusion

The Kurdistan Region is home to the finest agricultural land and also owns necessary water resources to implement the plans of the Ministry. By providing the necessary budget to support the farmers, and by developing the capabilities and the application of the modern marketing system,

Table 12. Projects by Province

Projects	Erbil	Sulaymania	Duhok	Garmyan	Halabja	Raparin	Total
Egg Production				1			1
Fish Farming	3	2	1	1	2	1	10
Producing Pitmos	1	1	2	1	1		6
Producing seedling for fruits and forest	2	2	2	1	1	1	9
Dairy projects	1	1	1	1			4
Olive orchard for Olive Oil	2	1	1	2			6
Tree plantation for wood industry	1	1	1	1	1		5
Building up Basee 2 dam			1				1
Building up of Bakerman and khlikan dams			1				1
Building up of Bardasor dam				1			1
Building up of taqtaq dam	1						1
Building up of Rawanduz dam	1						1
Apple molasses production and packaging industry			1				1
Pomegranate vinegar production industry		1	1		1		3
Grape Juice industry			1				1
Tomato Paste Production industry in Erbil	1						1
Building up mill for Flour	1	1	1	1	1		5
Building up mill for burgle	1	1	1	1	1		5
Total	15	11	15	11	8	2	62

the Kurdistan Region can reach self-sufficiency in agricultural products and ensure food security and the implementation of irrigation projects and dams. Through the implementation of a water law we can assure water security in the Kurdistan Region.

