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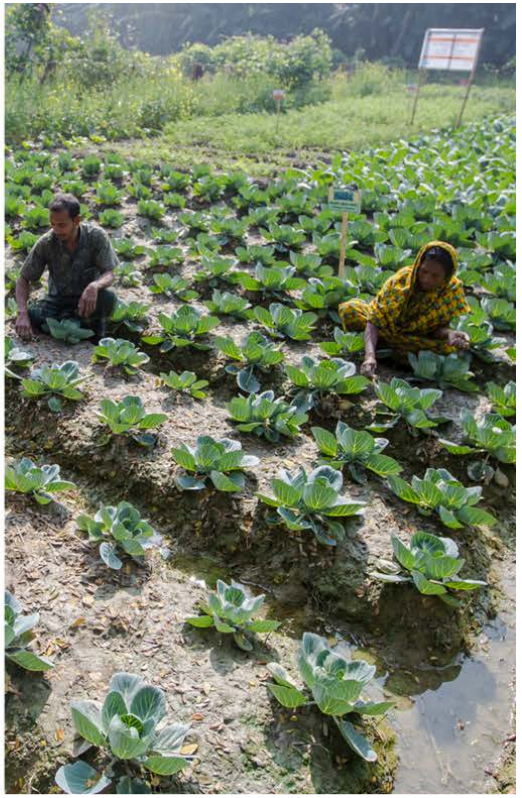
Agroport South Kherson 2018





Kingdom of the Netherlands

Food and Agriculture Organization of the United Nations

IBNiM

Dr. Arjen de Vos,
Salt Farm Foundation
Ukraine, 27 July 2018

Saline agriculture: a practical solution to a global problem

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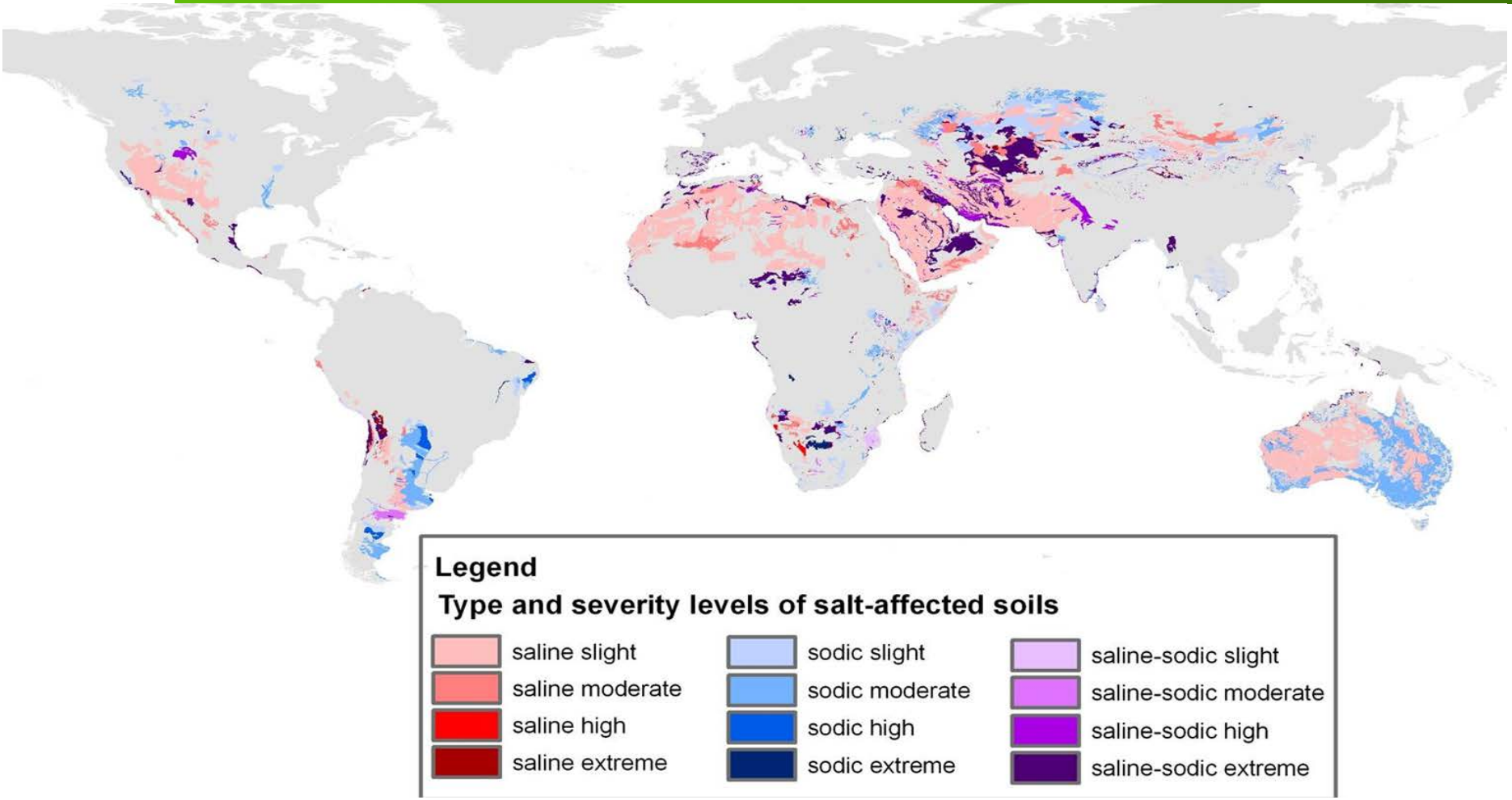
Why saline agriculture ?



Salt affected land 1 billion ha, and 20% of all irrigated land plus 2000 ha every day!

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Fresh water stress in 7 years,

but amount saline water = amount fresh water

can we use saline water for irrigation ?

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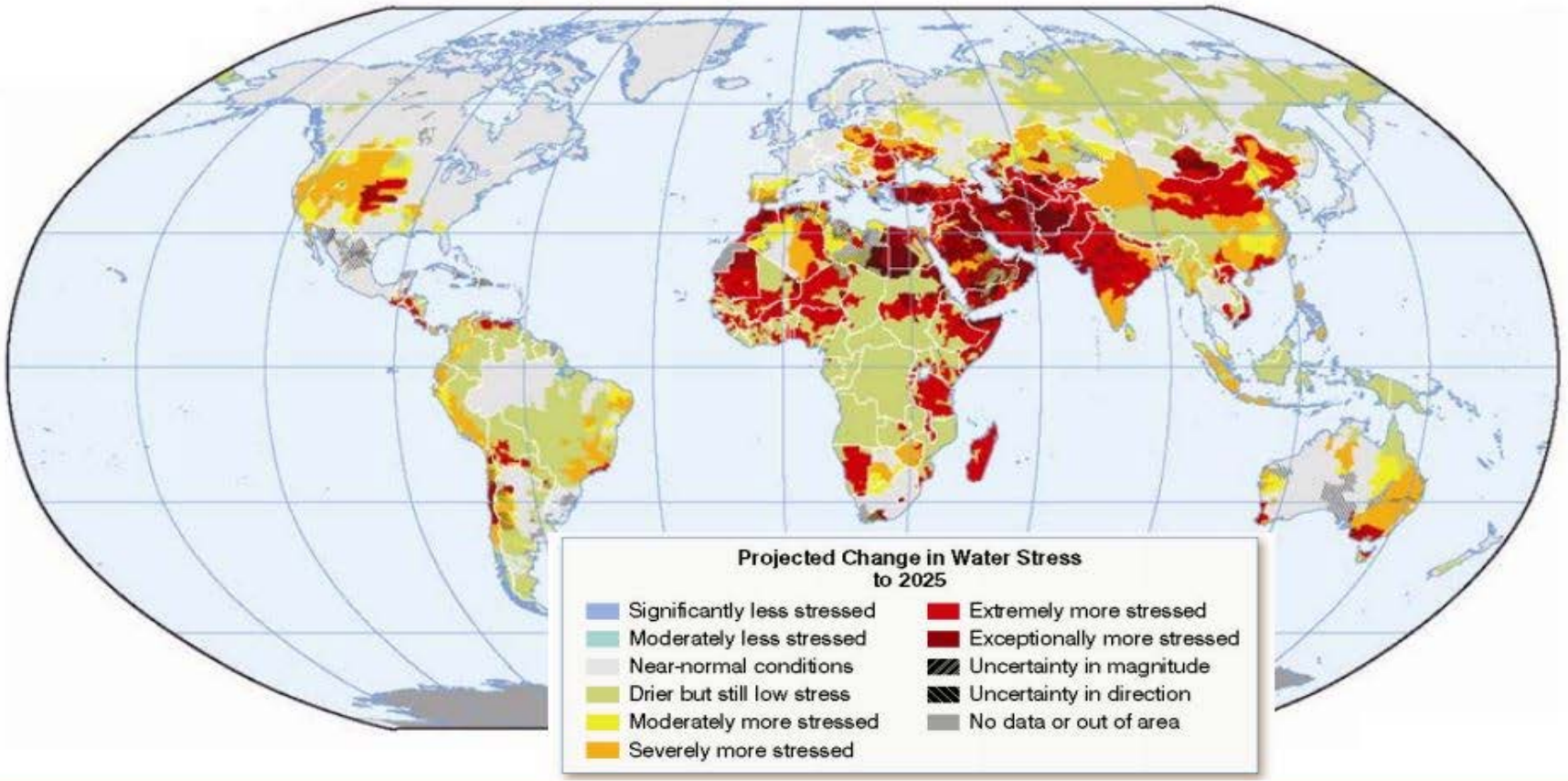
LEADING INTELLIGENCE INTEGRATION

Global Water Picture (2025)



National Intelligence Council 6

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saline agriculture, how do we do it?

First, screening and selection of salt tolerant crops

7 salt concentrations, 8 repetitions, 56 plots of 160 m^2, 1 hectare total

Best varieties from selection trials → determine exact level of salt tolerance → yield potential
Reference for other locations → yield gap analysis

800 varieties of 50 different crops tested

Data up until 2015 in report (available on website)

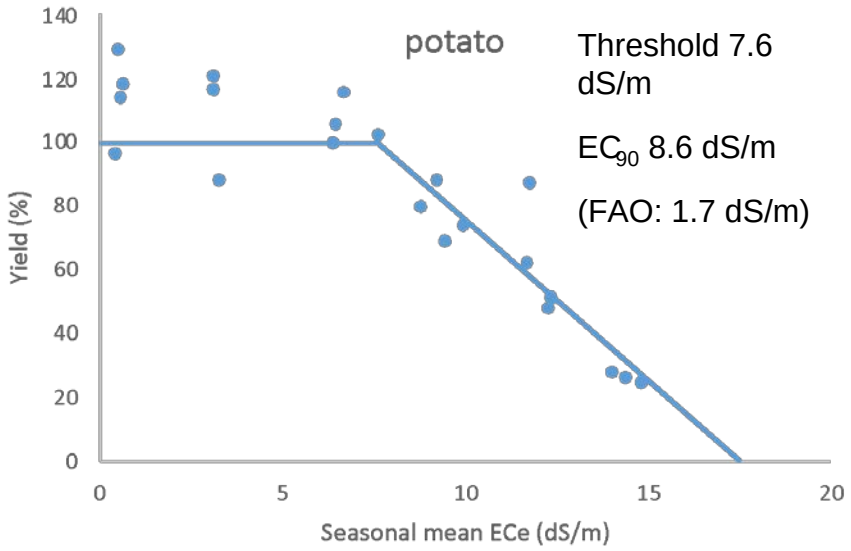
Publication in prep. (EC $_{90}$ method)

New data 2017, repeat in 2018

SaltFarm Texel
Tested on Texel

Crop salt tolerance

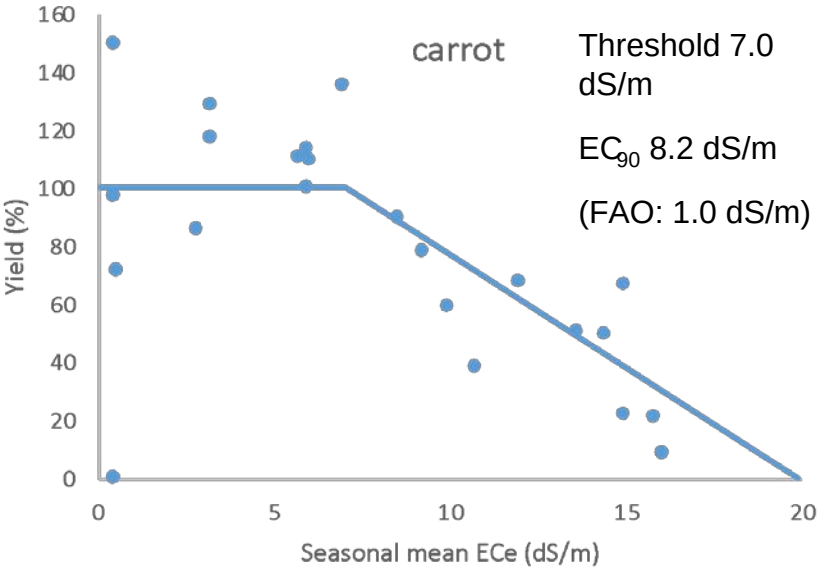
under controlled field conditions in The Netherlands, based on trials conducted by Salt Farm Texel



Threshold 7.6 dS/m

EC_{90} 8.6 dS/m

(FAO: 1.7 dS/m)



Threshold 7.0 dS/m

EC_{90} 8.2 dS/m

(FAO: 1.0 dS/m)

Scaling of (potato) cultivation

Using saline water, drip irrigation

Drought vs use of saline irrigation water

Current drought in the Netherlands

Potato field, picture taken on 16 July 2018 (island of Texel)

Drought vs use of saline irrigation water

Use of saline water for irrigation

* leaching and drainage

* soil structure, clay soils not recommended

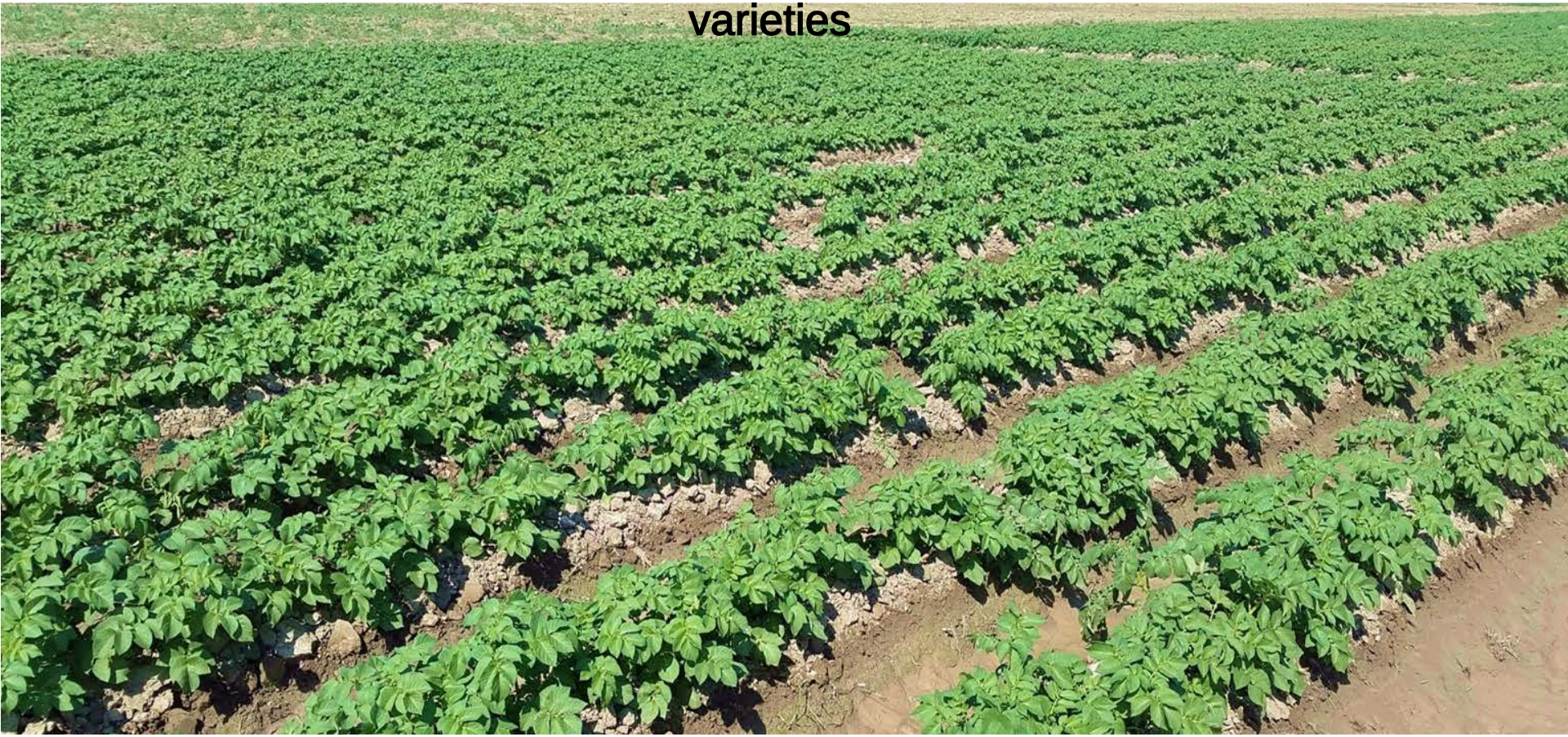
* soil improvement

* agro -ecology, agro -forestry

* for more info, see FAO handbook

Pakistan : producing potato on salt affected soil,
using saline water (6 million ha salt affected soils in Pakistan)

Validate growth of best varieties at local test location, plus local varieties



Yield at 7.5 dS/m is around 28 tons/ha (+28% than local variety, +40% national average)

Various locations also 50% water saving (use brackish water)

(picture taken in Sindh, Pakistan, saline sodic soil)

Bangladesh - Project 'the Salt Solution'

Identification of local problem, training of trainers/farmers, set up demo plots, selection of salt tolerant crops and cultivation strategy, monitoring, "helpdesk", fine tuning

Supported by NATIONALE POSTCODE LOTERIJ

Salt Farm Foundation – Knowledge Centre

International Knowledge centre:

- Open source sharing of knowledge on saline agriculture
- Education and training of farmers, extension workers, students and other stakeholders
- Training on site: on Texel or on location abroad

Supported by the Dutch Ministry of Agriculture, Nature and Food Quality

Ministry of Agriculture, Nature and Food Quality

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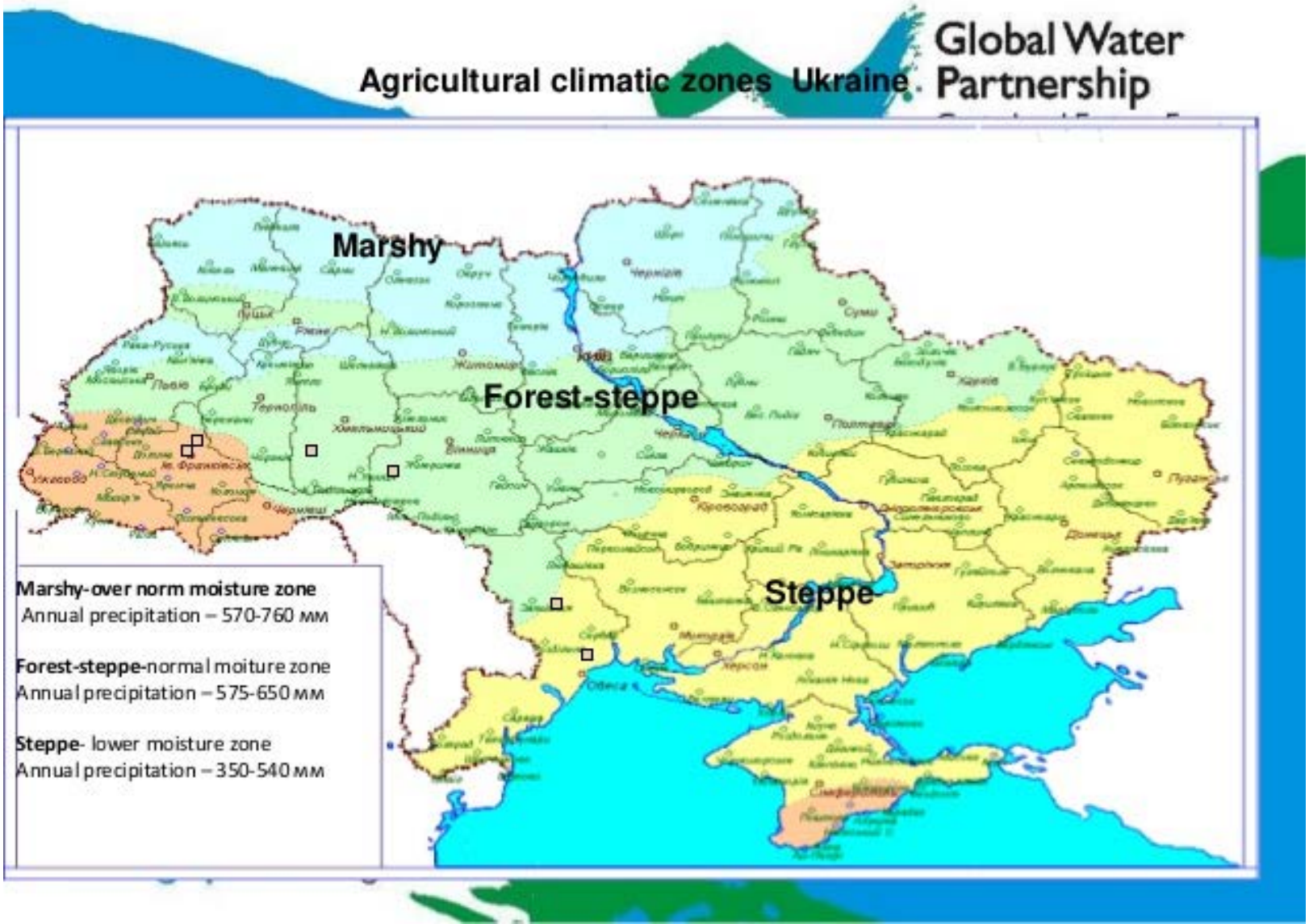
Situation Ukraine



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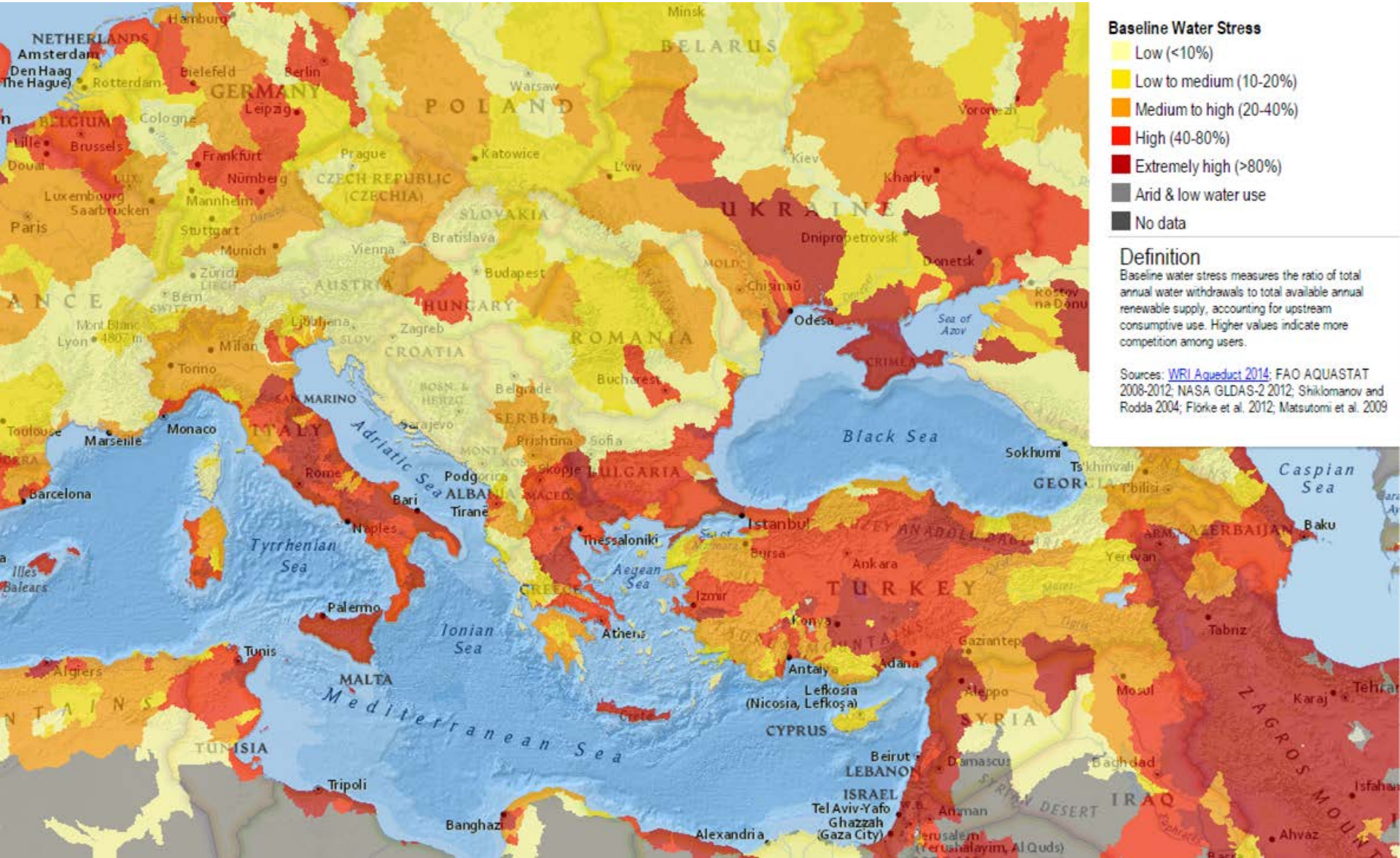
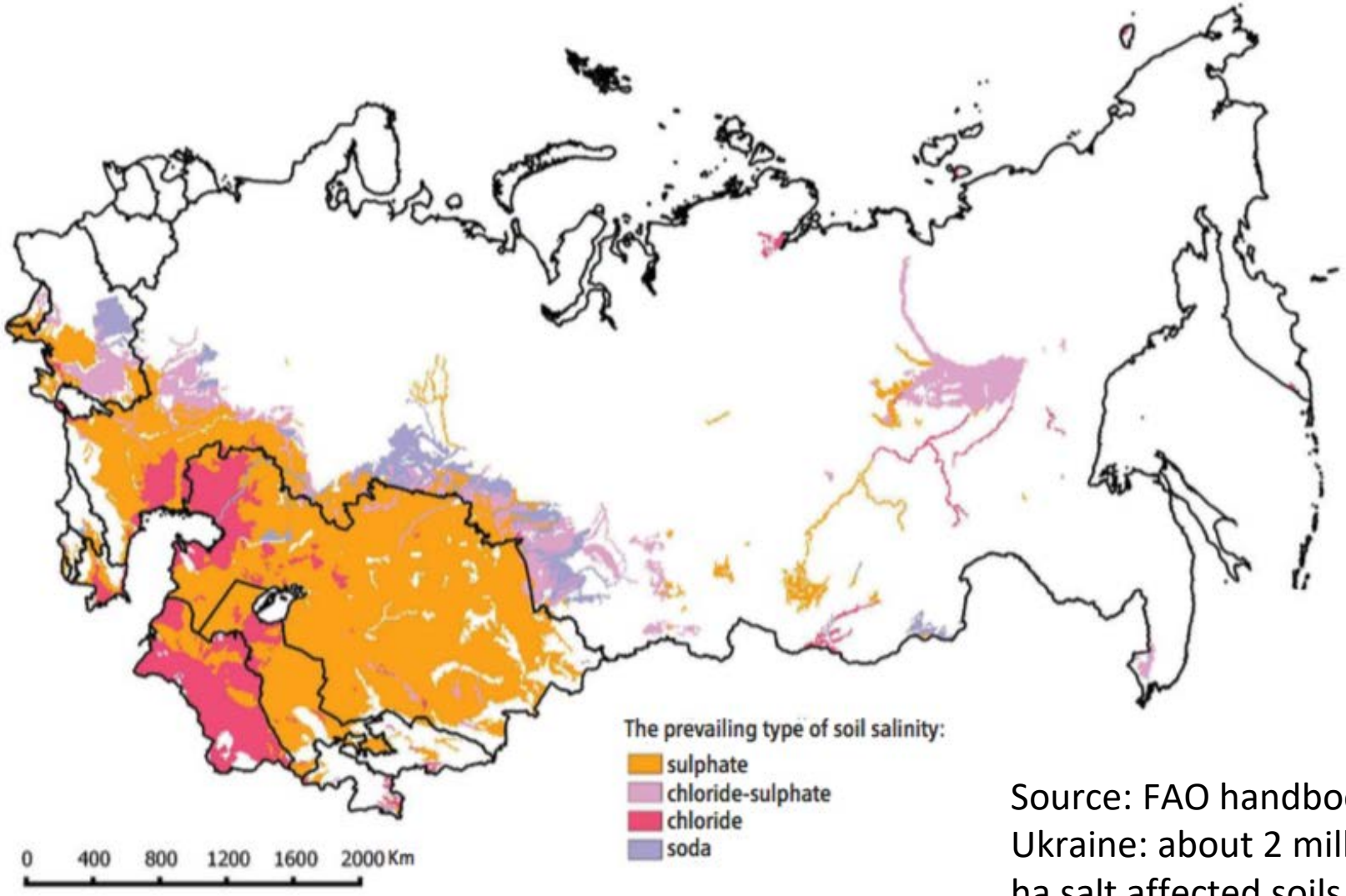
Situation Ukraine



Situation soil salinity Eurasian region



Source: FAO handbook
Ukraine: about 2 million ha salt affected soils of (formerly) irrigated land

Situation Ukraine

Drip irrigation in Ukraine

In Ukraine, drip irrigation is used for perennial crops as well as row fodder and vegetable crops within a total area of about **70000 ha** and there are demands for the construction of new drip irrigation systems to provide for an **annual increase** in their total area by **15000 ha**.

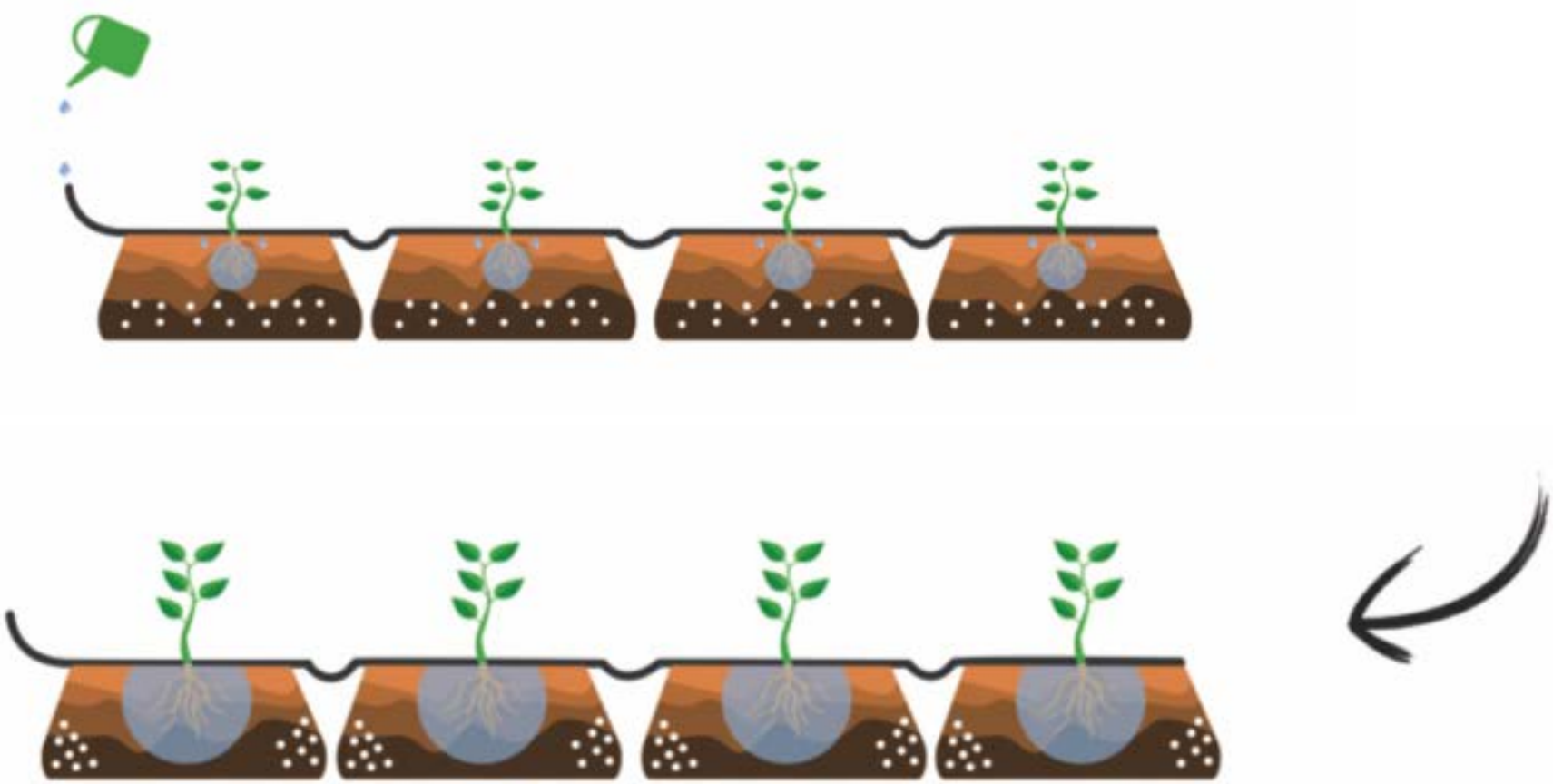
The use of drip irrigation in a rotation of vegetable crops **allows for the following**:

- optimal soil water, air, temperature and nutrient regimes;
- the possibility of prompt and efficient application of all agrotechnical measures;
- saving 1.5-5.0 times more irrigation water than traditional irrigation systems;
- lowering the costs of energy expenditure on irrigation by 1.5-25 times;
- saving of 30-50% in fertilizers due to their direct placement into the root zone in irrigation water solutions.

Thus, the **further development** of soil irrigation systems in Ukraine should involve the implementation of soil-water regulations and water-saving amelioration measures based on new and appropriate irrigation techniques and regimes.

Source: FAO handbook

Drip irrigation in salt affected soils, use of raised beds



Salt Farm illustration

Situation Ukraine

AGRICULTURE IN UKRAINE

ROLE IN THE UKRAINIAN ECONOMY

OF THE TERRITORY
70%

Agricultural lands constitute
41.5 MILLION HECTARES
70% of the territory of Ukraine

41%
OF EXPORT

In 2017 agricultural exports came to
$17.8 BILLION

OF GDP
18%

Agricultural production in 2017 amounted to
₴700 BILLION

Source: SSSU, MAPF

ROLE IN WORLD AGRICULTURE

EXPORT EARNINGS

	Export, mln $	Production	Export
sunflower oil	4 302	#1	#1
corn	2 989	#8	#4
wheat	2 760	#7	#5
soybeans	1 060	#8	#6
rapeseed	882	#6	#3
sunflower meal	804	#1	#1
barley	711	#3	#4
poultry meat	590	#19	#7
white sugar	280	#17	#9
butter	130	#9	#5
soybean oil	125	#22	#8
soybean meal	108	#23	#8
walnuts	101	#5	#3
powdered milk, cream	81	#11	#7
rapeseed oil	51	#16	#7
cheese	33	#10	#9

Source: USDA, rank by natural indicators

Situation Ukraine, first questionnaires

Questionnaire for determining the state of soils on agricultural areas		Анкета визначення стану ґрунтів на с/г ділянках	
Personal information from this profile will not be disclosed		*Особиста інформація з цієї анкети не буде розголошуватися*	
Your contact information: e-mail address, telephone, name, company name	State Enterprise "Experimental farm" Big Clines "of the Southern state agricultural research station of the Institute of Water Problems and Melioration of the National Academy of Sciences of Ukraine» +3805539-3-35-21 dpdgvklin@ukr.net acting director Oleksandr Shablya	**Ваша контактна інформація:** електронна адреса, телефон, ім'я, назва підприємства	Державне підприємство «Дослідне господарство «Великі Клини» Південної державної сільськогосподарської дослідної станції Інституту водних проблем і меліорації НААН» +3805539-3-35-21 e-mail: dpdgvklin@ukr.net в.о. директора Шабля Олександр Сергійович
Site location:	GPS: 46° 19'48"N 32° 36`05"E	**Місце знаходження ділянки:**	Додайте GPS координати: 46°19'48" с.ш. 32°36'05" в.д.
Address	Village Velykyi Klyn, Hola Prystan district, Kherson Region, Ukraine	Країна, регіон	Україна. Херсонська область, Голопристанський район,с. Великий Клин, вул. Конотопа, буд. 7.
Site landscape	The farm is located in the southwestern part of the Kherson region in the Dnieper Lowland in the steppe zone, Type of relief: plain-wavy	Опишіть рельєф ділянки: річки, пагорби, тощо....	Господарство розташоване в південно-західній частині Херсонської області в Придніпровській низовині в степовій зоні. Тип рельєфу: рівнинно-хвилястий
Is your soil salt affected? *If yes, how do you know? Do you have results of soil and water analysis? What is the salinity level of your soil and water? Is the salinity linked to a specific time of the year?*	Results of soil analysis Depth of humus layer - up to 75 cm The content of humus on average - 0.5- 0.7%, up to 1% Absorbing capacity - 7.4 - 10.2 mg-eq. per 100 g Among the absorbed bases, calcium cations (7.7 mg equivalents per 100 g of soil) prevail.	**Чи спостерігається на Вашій ділянці засолення ґрунту?** *Якщо так, як Ви це визначили? Чи є у Вас результати аналізу ґрунту або води? Який рівень солоності ґрунту / води? Чи залежить рівень солоності від пори року? За цим посиланням Ви можете переглянути відео, як проводити аналіз ґрунту.*	Результати аналізу грунту Глибина гумусового прошарку - до 75 см Вміст гумусу в середньому – 0,5-0,7%, до 1% Поглинаюча спроможність – 7,4 – 10,2 мг-екв. на 100 г В складі поглинутих основ переважають катіони кальцію (7,7 мг-екв на 100 г ґрунту). Гідролітична кислотність - 0,62-

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Testing sunflower for salt tolerance

4 different varieties (2015)

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Testing wheat (24 lines) and oat (12 lines) for salt tolerance

Salt tolerance resembles drought tolerance,
Lines developed by University of Gothenburg, Sweden

recommendations

Crop and variety selection, for increasing salinity levels and drought

Soil / biophysical analysis and sustainable soil management, soil fertility

Cultivation management (fertilizer use, (drip) irrigation, crop maintenance,…)

Socio-economic aspects

Sustainable water use

Policy support

Salt affected soils irrigated with fresh water vs saline irrigation

Recommendations

- Set up research and demo farm for saline agricultural practises
- Determine best crops and varieties for local conditions
- Develop saline cultivation strategy, with a focus on (drip) irrigation
- Increase water holding capacity of the soil (increase organic matter)
- Extra attention to soil fertility and soil structure
- Develop training for lead farmers
- Implement saline cultivation at several farms for further training and demo
- Facilitate upscaling in salt affected areas

Additional resources

- FAQs - https://www.salineagricultureworldwide.com/faq
- Reports & publication - https://www.salineagricultureworldwide.com/reports -publications
- Guide for soil salinity test - https://www.salineagricultureworldwide.com/questionnaire
- Open-air lab/test field - https://www.saltfarmtexel.com/research - station
- Salt Farm Texel on CBS News (USA)- https://www.saltfarmtexel.com/news/salt -farm -texel -on -cbs-news

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Additional resources

- Current FAO project on land reclamation https://www.thegef.org/sites/default/files/project_documents/05 -05-2017_ProjectDocument_0.pdf
- WUR project of steppe reclamation of 2009. It is about Lugansk region (very east of Ukraine) but the same climatic zone as South http://edepot.wur.nl/51005
- AO Handbook on Saline Soil Management http://www.fao.org/publications/card/en/c/I7318EN/
- Materials on FAO training in Kharkiv region (North -East) http://www.fao.org/global -soil-partnership/resources/highlights/detail/en/c/1073283/
- WB report Ukraine: Soil fertility to strengthen climate resilience: http://documents.worldbank.org/curated/en/755621468319486733/pdf/918500WP0UKRAI0E0Box385344B00OUO090.pdf
- Report on the first researches of soil salinization of the South (pp324) http://issar.com.ua/downloads/docs/nv3.pdf

Contact us

For more information you can contact or visit us

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