HarvestZinc
exploring fertilizer use to increase zinc in cereals

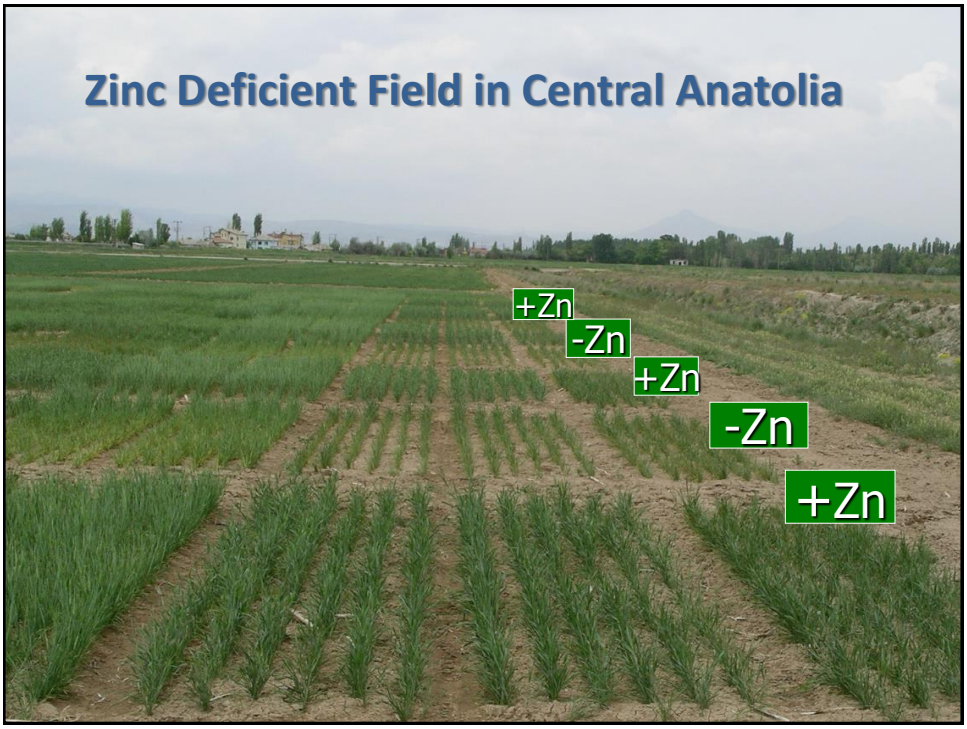
HarvestPlus
Breeding Crops for Better Nutrition

NATO-Zinc Fertilizer Project and HarvestPlus-HarvestZinc Project

Ismail Cakmak
Sabanci University, Istanbul

Mosaic · KALI · Zinc · OMEX · ifa · IPNI · BAYER · ADOB · Valagro · fbsciences · ATP NUTRITION

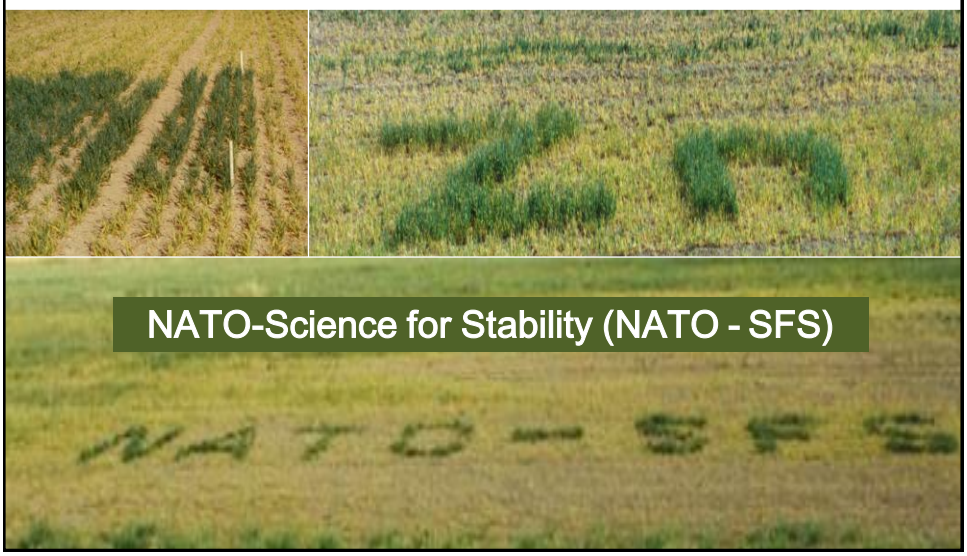
Sabancı Üniversitesi



Pictures from NATO-Zinc Project in Central Anatolia.

Green Areas show the areas treated with Zinc Fertilizers.

Project was supported by NATO Science for Stability Program (NATO-SFS)

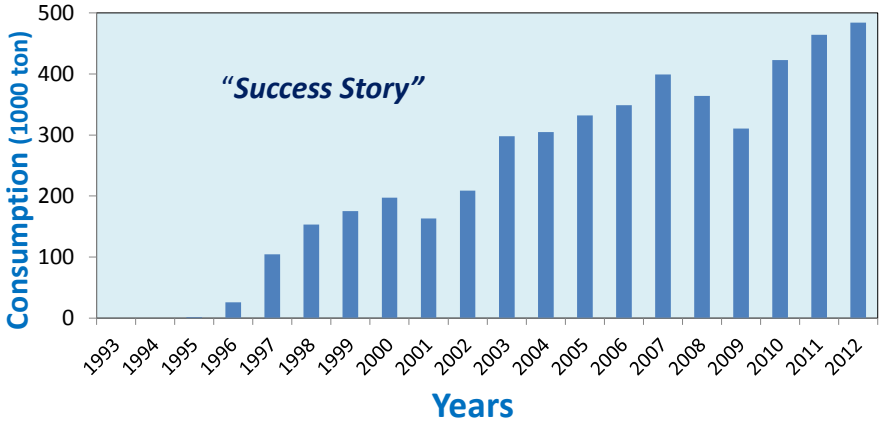


Project with 1 Million USD Budget Generated a Benefit of 100 Million USD

Successful zinc deficiency project gets world-wide recognition

The results of a study of the reasons for zinc deficiency in wheat crops in Turkey, which was funded through the NATO Science for Stability programme in the early 1990s, are now being demonstrated at international symposia with a view to extending Turkey's experience to other areas of the world. Wheat production in Turkey at that time had very low yields, and the study aimed to identify the underlying causes and a possible link to zinc deficiency. The results of the study were spectacular, and were quickly passed on to interested parties, including Turkish farmers and the TOROS fertilizer company. Today, the total amount of zinc-containing fertilizers applied in Turkey is 300,000 tonnes, up from zero ten years ago, and Ministry of Agriculture estimates put annual economic benefits at 100 million dollars. In addition, large numbers of the Turkish population which have suffered from a diet containing too little zinc, now

Use of Zinc Containing Compound Fertilizers after NATO-Zinc Fertilizer Project in Turkey



Source: Ministry of Agriculture and Toros Fertilizer

Statement of IFA

-International Fertilizer Industry Association-

12 April 2005:

"The Anatolia initiative is one of the world's first examples of using agricultural practices to address public health problems as well as improved crop production, and its success provides a model for countless other nations"

HarvestPlus
Breeding Crops for Better Nutrition

HarvestZinc
exploring fertilizer use to increase zinc in cereals

HarvestZinc Project

A similar Zinc Fertilizer Program has been established to conduct on various countries with a special focus on the role of zinc fertilization on grain zinc concentration of various stable food crops such as wheat, rice, sorghum, maize.

Global Zinc Fertilizer Project
II. Phase

HarvestPlus
Breeding Crops for Better Nutrition

HarvestZinc
exploring fertilizer use to increase zinc in cereals

2011 June- 2014 May

Mosaic · KALI · Zinc ...essential for life · OMEX · ifa · Bayer CropScience · ADOB · Valagro · fbsciences · IPNI · ATP NUTRITION Powering Growth with Science™

Sabancı Üniversitesi

For a better Zn nutrition of human beings,
cereal grains should contain around
40-60 mg Zn kg^{-1}

Current Situation:
10-30 mg kg^{-1}

Grain Zn concentration in different countries with and without foliar zinc fertilization

Country/Location	-Zn	+Zn
	mg kg^{-1}	
India		
•Varanasi	29	47
•PAU-I	25	81
•PAU-II	28	77
•PAU-III	26	61
•PAU-IV	49	65
•IARI	33	45
Kazakhstan		
•Loc-I	19	54
•Loc-II	28	73
Pakistan		
•Loc-I	27	48
•Loc-II	28	44
•Loc-III	30	40
•Loc-IV	29	60

Country/Location	-Zn	+Zn
	mg kg^{-1}	
Mexico		
•Year-I	21	45
•Year-II	36	60
Turkey		
•Konya	12	29
•Adana	32	57
•Samsun	23	49
•Eskisehir	22	43
China		
•Loc-I	28	54
•Loc-II	19	26
Australia		
•Loc-I	18	39
Germany		
•Average	20	32
Iran		
•Average	17	28
Brazil		
•Average	30	52

Average of all countries -Zn: 26 +Zn:50

www.harvestzinc.org

Grain Zn amount in various countries with and without Zn-fertilization

Country/Location	-Zn	+Zn
	mg kg^{-1}	
India		
•Varana		
•PAU-I		
•PAU-II		
•PAU-III		
•PAU-IV		
•IARI		
Kazakhstan		
•Loc-I		
•Loc-II		
Pakistan		
•Loc-I		
•Loc-II	28	44
•Loc-III	30	40
•Loc-IV	29	60

Country/Location	-Zn	+Zn
	mg kg^{-1}	
Mexico		
•Year-I	21	45
	36	60
	12	29
	32	57
	23	49
	22	43
	28	54
	19	26
	18	39
	20	32
Iran		
•Average	17	28
Brazil		
•Average	30	52

Average Concentrations of Grain Zn

(10 Countries with 32 locations)

-Zn: 26 ppm

+Zn: 50 ppm

www.harvestzinc.org

Export Micronutrient-Biofortified Wheat to Target Countries: A contribution to the Solution of the Micronutrient Malnutrition?

The United State, Canada, Australia and European Union are among the most important wheat exporting nations globally. These nations could significantly contribute to reducing the high incidence of micronutrient malnutrition in human populations by exporting micronutrient-biofortified wheat grain.

At least a part of the wheat exported to these countries could be biofortified with micronutrients by fertilization strategy.

This micronutrient-biofortified wheat grain could be shipped to the target regions of the selected developing countries where those developed countries have an existing aid program.

Targeted regions could be then monitored for selected nutrition and development parameters to assess the health impacts of the micronutrient-enriched wheat grain in those countries.

If such a strategy were shown to be successful from human effectiveness trials, Zn-biofortifying programs could be extended to all nations with a high incidence of zinc deficiency in their populations.