Joint FAO/IAEA Programme
Nuclear Techniques in Food and Agriculture

Nuclear Applications in Agriculture
Success Stories from **Europe and Central Asia** in facts and figures

The Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture - key to the successful and unique FAO-IAEA partnership - helps countries develop capacity to optimise the use of nuclear and related technologies for food and agricultural development. The following facts and figures illustrate select impacts of this work in Europe and Central Asia.

8 TECHNICAL COOPERATION PROJECTS ongoing in the field of food and agriculture in 2015. The Joint FAO/IAEA Division works to build partnerships, strengthen regional cooperation and build human and institutional capacity in the sustainable application of nuclear technology for food and agricultural development.

37 countries requesting and receiving one or more services from at least one of the FAO/IAEA Agriculture & Biotechnology Laboratories each biennium, reflecting the importance of these services to Member States and an indication of their unique alignment with the food and agricultural issues faced by the concerned countries.

35 research contract holders benefit from the Joint FAO/IAEA Division's global network of almost 500 research institutes and experimental stations, increasing their R&D capacity as a result of coordinated research projects managed by the Joint FAO/IAEA Division, making it one of the largest collaborative agricultural research networks worldwide.

98 trainees participated in 45 training courses and workshops in 2015 and learned to apply one or more nuclear technologies in the field of food and agriculture.

973 MUTANT VARIETIES

developed in 106 different crop species and released to farmers. These include Golden Promise barley, a mutant variety that went on to become the standard for malt quality and is still popular in the production of premium quality whisky by select distilleries in **Scotland**.

21% of requests

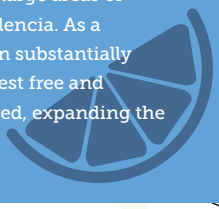
for the irradiation of food and feed crops, ornamentals and other plants, handled by the Joint FAO/IAEA Division, come from the **United Kingdom**; 19% from **Germany**, 9% from **Poland**, 6% each from **Austria** and **Turkey**, 5% from **Sweden**, 4% from **Spain**, while a further 24 countries share the remaining 30%, covering a total of 90 plant varieties. This mutation induction service significantly strengthens national R&D, crop improvement programmes and related farmer and business enterprises.

6 research institutes

in **Austria, Belgium, Germany, the Netherlands, Turkey** and the **United Kingdom** collaborate with the Joint FAO/IAEA Division on research to support the control of chemical food contaminants for the benefit of international public health and the enhancement of trade.

250 million

sterile medflies produced every week at the insect mass rearing and sterilization facility in Valencia, **Spain**. Sterile flies are released over large areas of commercial citrus production in Valencia. As a result, medfly populations have been substantially suppressed and the production of pest free and insecticide free oranges has increased, expanding the European and USA markets.



80%

the expected increase in the risk of water erosion in agricultural areas of the European Union by the year 2050. In efforts to mitigate the impact of climate change, institutes in **Austria**, **Italy**, **Spain**, **Switzerland** and the **United Kingdom** are collaborating with the Joint FAO/IAEA Division to develop innovative nuclear techniques and/or approaches to reduce soil erosion and sedimentation-related environmental problems.

1.8 Billion USD

the additional revenue generated by Italian farmers during the decade of peak cultivation of the durum wheat mutant variety Creso, also known as pasta wheat and macaroni wheat. Within a short time this mutant variety held 53.3% of the market of certified wheat seeds in **Italy** and was grown on 400 000 ha.

0.2% infestation

by Mediterranean fruit fly larvae in mandarin export shipments from the Neretva Valley in **Croatia** through the use of area-wide integrated fruit fly suppression methods, including male annihilation and the release of 350 million sterile flies per year. This achievement also resulted in the reduction of 20,000 litres of insecticide use per year and the award of the prestigious *"Controlled Designation of Origin"* label by the European Union.

30%

of total greenhouse gas (GHG) emissions derive from agriculture and land use changes, due mainly to the inefficient use of chemical fertilizers, improper use of farm effluent and manure, and to overgrazing. **Estonia**, **Germany** and **Spain** are working in an international coordinated research network to find integrated solutions to reduce GHG emissions associated with agriculture, while making soil more resilient to climate change.

200
million US $

the potential savings to **Tajikistan** in wheat imports through implementation of remedial action to effectively control soil erosion and reduce soil fertility loss on the 240 km² in the High Pamir Mountain region classified as arable. Tajikistan used fallout radionuclides in the evaluation, adaptation and mitigation of soil erosion and successfully implemented remedial action in the pilot area.

1999/2/EC

is the Directive of the European Parliament and of the Council concerning foods and food ingredients treated with ionising radiation to which **Macedonia**, as candidate for accession to the European Union, aims to comply. Through a technical cooperation project, Macedonia enhanced its technological and human capacity in food irradiation sufficiently to comply with this Directive.

200 US $/ha

the initial one-off investment needed to generate an annual saving estimated at US $2,000/ha in time, energy, fertiliser and labour costs to potato farmers in **Turkey** through the transition to innovative drip fertigation technology that radically improves water- and nitrogen-use-efficiency. The national government and several local authorities greatly subsidise these investment costs.

75%

the nitrogen-use-efficiency achieved in **Slovenia** through the transition to fertigation technology, compared to only 45% with sprinkler irrigation – it also required less than one third of the water. As a result, Slovenia is now able to comply with EU Water Framework Directive 2000/60/EC.

20
MILLION STERILE INSECTS

released each week in the Arava Valley in **Israel** to protect bell peppers against the devastating ravages of the Mediterranean fruit fly. In twelve years bell pepper production in the valley increased from US $1M per year to US $150M. In this "*bridge to peace*" alliance, the integrated pest control programme has expanded to both the West Bank and Jordan's northern valley where Palestinian and Jordanian fruit growers are now releasing sterile flies to control this pest.

>300 scientists

from 25 countries, sponsored in part by the Joint FAO/IAEA Division, sequenced the cow genome. This is generating extensive excitement among scientists, cattle breeders and farmers globally because it offers the chance to select for special features, such as high-quality milk and other promising qualities.

25 countries

use animal disease diagnostic techniques developed or validated by the Joint FAO/IAEA Division to support the prevention, early detection, control and eradication of animal diseases, such as foot-and-mouth disease, African swine fever, avian influenza and Rift Valley fever. These diagnostic tools are used in conjunction with other control measures also in the health programmes of WHO, OIE, FAO and CG-centres to combat dangerous zoonotic diseases and decrease the risks of their transfer to human populations.

45 institutes

in 16 countries collaborate with the Joint FAO/IAEA Division in EU and FAO/IAEA funded projects to improve food integrity along the food supply chain, including food authenticity and food traceability.

125 methods

for analysing foods have been validated by the Joint FAO/IAEA Division and transferred to Member States. These help to reliably monitor veterinary drug, pesticide, heavy metal and mycotoxin residues and contaminants. The methods are made freely available, using the internet as a platform, and are shared through the Joint FAO/IAEA Division's database on Food Contaminant and Residue Information System.

35 countries

have shown interest in participating in a regional technical cooperation project intended at controlling *Aedes* mosquito species, some of which are major vectors of human pathogens, including dengue, chikungunya, zika and yellow fever. The approved project aims at providing capacity building and awareness about sterile insect technique based technologies as a component of integrated vector management approaches for mosquito and disease control.

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