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Networking, partnerships and tools to enhance *in situ* conservation of European plant genetic resources

Crop wild relative *in situ* conservation case studies

Citation

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Summary

This report provides an extensive list of experiences related to *in situ* conservation of crop wild relatives, resulting from a survey of scientific publications, websites and direct contacts with the people who took part in them. It comprises 57 initiatives with the names of the networks, the type of network, the countries in which they occur, target CWR taxa and source information, including bibliographic references, contact institutions and/or web links. In the context of the Farmer's Pride project, from this list a few cases will be selected and more deeply analysed and assessed to identify good examples of successful design and/or implementation of crop wild relative networks at the local and national levels, both in and outside of Europe.

Introduction

Background

Crop wild relatives (CWR) are plant taxa closely related to crops that constitute a valuable source of plant diversity as a reservoir of genetic variation for crop improvement. In response to the challenges that global change imposes on food security, the wide trait availability in this group of plants is a key element for successful agricultural adaptation in uncertain times.

A wide range of habitats of the world host CWR. However, considering that most natural habitats are experiencing a continuous degradation worldwide, the protection of this group of plants is becoming more urgent than ever. To tackle this problem, it is necessary to implement both *in situ* and *ex situ* conservation actions. While the *ex situ* conservation of CWR has received some attention by genebanks worldwide, adapting the practices used to preserve seeds of landraces and commercial varieties, there has been very little implementation of *in situ* conservation practices of CWR. Furthermore, in many cases, these practices are scattered, isolated and uncoordinated. The present list provides a unique opportunity to review at a single glance the different initiatives that have taken place around the world and to obtain an insight into the current status of *in situ* conservation of CWR.

Context

This document – *A list of crop wild relative in situ conservation case studies* – is a product of the activities of the Farmer's Pride project (farmerspride.eu), namely building a European network for *in situ* conservation and sustainable use of plant genetic resources. The present document marks the achievement of Milestone 5 in the framework of Work package 1, *Networking options*. The purpose of this work is to identify, as thoroughly as possible, all the different past and present initiatives worldwide related to *in situ* CWR conservation and the implementation of CWR genetic reserve networks. It aims to collect all types of experiences that operate in different forms and at different scales. It is meant to provide a baseline from which the most successful showcases will be analysed and evaluated at a later stage of the Farmer's Pride project. The elements that contributed to their success will be taken into account in the forthcoming establishment of the European CWR network.

Contents

As the number of ongoing and past experiences related to *in situ* CWR conservation worldwide is very low, we have widened the scope. Therefore, in addition to gathering information about experiences involving the implementation of CWR genetic reserve networks, we have assembled information on other types of networks related to CWR conservation, including networks of people and institutions related to CWR conservation, networks associated to projects dealing with CWR conservation, and other initiatives that could potentially result in networks for CWR conservation.

The list distinguishes four types of CWR networks:

1. **CWR genetic reserve networks:** networks of protected sites with the purpose of conserving the genetic diversity of selected CWR. In some cases, the main purpose of these protected sites may cover a wider scope (e.g., conservation of plant biodiversity in general).
2. **Potential genetic reserve networks:** areas where CWR are known to occur and have been studied for conservation purposes. The acquired knowledge facilitates the implementation of CWR genetic reserves. However, this does not necessarily imply that they are currently actively or passively conserved.
3. **People and institutions networks:** networks of different kinds (e.g., scientific research groups, public administration, protected areas managers) that contribute to the conservation of CWR in different ways (e.g., provision of a public database of CWR).
4. **Networks associated to projects:** networks of sites that hold CWR and/or people and institutions related to CWR conservation projects. These networks were operative while the project was active, but conservation activities may have discontinued when the project ended.

To collect this information, we have searched through specialised literature and consulted different databases using the terms ‘crop wild relative’ and ‘network’ or ‘genetic reserve’, ‘gene management zone’ or ‘conservation’, among others. In this survey for exemplary CWR showcases we have also consulted Farmer’s Pride project collaborators, as well as members of the IUCN Crop Wild Relative Specialist Group (CWRSRG) and other experts.

The list (Table 1) comprises 57 case studies: 34 genetic reserve networks, eight potential genetic reserve networks, three people and institutions networks and 12 networks associated to projects. The list provides the names of the networks, the countries in which they occur, the type of network, target CWR taxa and source information, including bibliographic references, contact institutions and/or web links.

Table 1. List of crop wild relative *in situ* conservation case studies.

Name	Country	Type of network	Crop (target CWR)	Bibliographic references / Web URL / Contact institution
1. Erebuni state reserve in Armenia	Armenia	Genetic reserve network	Wheat (<i>Triticum boeoticum</i> , <i>T. urartu</i> and <i>T. araraticum</i>)	<ul style="list-style-type: none"> – Avagyan, A. (2008) Crop wild relatives in Armenia: diversity, legislation and conservation issues. In Maxted, N., Kell, S., Ford-Lloyd, B.V., Dulloo, E. and Iriondo, J. (Eds.) <i>Crop Wild Relative Conservation and Use</i>. CABI International, Wallingford, UK, pp 58-68. – Batello, C. and Marzot, M. (2010) <i>Gardens of biodiversity: Conservation of genetic resources and their use in traditional food production systems by small farmers of the Southern Caucasus</i>. Food and Agriculture Organization of the United Nations, Rome. – Heywood, V.H. and Hunter, D. (2012) <i>Crop Wild Relatives: A Manual of in situ Conservation</i>. Routledge, London.
2. Saving our Species programme	Australia	Genetic reserve network	Macadamia nut (<i>Macadamia integrifolia</i>), finger lime (<i>Citrus australasica</i>), among another 11 CWR.	<ul style="list-style-type: none"> – NSW Government (2019) <i>Saving our Species partnership opportunities</i>, NSW Government, viewed April 2019, environment.nsw.gov.au/topics/animals-and-plants/threatened-species/saving-our-species-program/saving-our-species-partnerships/partnership-opportunities. – Broadhurst, L. and Coates, D. (2017) Plant conservation in Australia: Current directions and future challenges, <i>Plant Diversity</i>. 39:348–356. – Mulongoy, K.J. and Gidda, S.B. (2008) The Value of Nature: Ecological, Economic, Cultural and Social Benefits of Protected Areas. <i>Secretariat of the Convention on Biological Diversity</i>. Montreal, Quebec, Canada.
3. Genetic Reserve Network for Wild Celery	Germany	Genetic reserve network	Celery (<i>Apium graveolens</i> ssp. <i>graveolens</i> , <i>Helosciadium repens</i> , <i>H. inundatum</i> and <i>H. nodiflorum</i>)	<ul style="list-style-type: none"> – Institute for Breeding Research on Agricultural Crops (2019) <i>Conservation and sustainable use of genetic diversity</i>, JKI Federal Research Centre for Cultivated Plants, viewed February 2019, julius-kuehn.de/en/breeding-research-on-agricultural-crops/fields-of-activity/conservation-and-sustainable-use-of-genetic-diversity/ – Frese L. (2019) Designation of the first five crop wild relative genetic reserves in Germany and Europe. ecpgr.cgiar.org/fileadmin/templates/ecpgr.org/upload/PHASE_X/WORKING_GROUPS/Wild_species/Designation_genetic_reserves_Germany_final_with_photo_v2.pdf – Frese L., Bönisch M., Nachtigall M., Schirmak U. (2018) Patterns of genetic diversity and implications for in situ conservation of wild celery (<i>Apium graveolens</i> L. ssp. <i>graveolens</i>). <i>Agriculture</i> 8, 129. – Zehm, A. and Weber, G. (2013) Umsetzung eines landesweiten floristischen Artenhilfsprogramms – Konzepte und Erfahrungen. <i>ANLiegen Natur</i> 35: 40 – 54.
4. Network of genetic reserves for <i>Vitis sylvestris</i>	Germany	Genetic reserve network	Grape (<i>Vitis sylvestris</i>)	<ul style="list-style-type: none"> – Federal Office for Agriculture and Food (BLE) (2019) <i>Network of genetic reserves for Vitis sylvestris</i>, GENRES, viewed October 2019, genres.de/en/sector-specific-portals/cultivated-and-wild-plants/in-situ-conservation/network-of-genetic-reserves-for-vitis-sylvestris/ – Ledesma-Krist GM, Nick P, Daumann J, Maul E, Dister E. (2014) Überlebenssicherung der Wildrebe <i>Vitis vinifera</i> L. ssp. <i>sylvestris</i> (C.C. Gmel.) Hegi in den Rheinauen durch gezieltes in situ-Management. Bundesanstalt für Landwirtschaft und Ernährung. download.ble.de/06BM001/06BM001.pdf – Nick P. (2014) Schützen und nützen – von der Erhaltung zur Anwendung, Fallbeispiel Europäische Wildrebe. In: Poschlod P, Borgmann P, Listl D, Reisch C, Zachgo S. <i>Handbuch Genebank WEL. HOPPEA Denkschriften der Regensburgischen Botanischen Gesellschaft. Sonderband 2014</i>. Pp. 159 – 173.

Table 1 (cont.). List of crop wild relative *in situ* conservation case studies.

Name	Country	Type of network	Crop (target CWR)	Bibliographic references / Web URL / Contact institution
5. Network of genetic conservation areas grassland	Germany	Genetic reserve network	Grassland species	– Federal Office for Agriculture and Food (BLE) (2019) <i>Network of genetic conservation areas grassland</i> , GENRES, viewed October 2019, genres.de/en/sector-specific-portals/cultivated-and-wild-plants/in-situ-conservation/network-of-genetic-conservation-areas-grassland/ .
6. Flusslandschaft Elbe Biosphere Reserve (includes the Steckby-Lödderitzer Forest Nature Reserve)	Germany	Genetic reserve network	Pear (<i>Pyrus achras</i> and <i>P. pyraster</i>) and apple (<i>Malus sylvestris</i>)	– Mulongoy, K.J. and Gidda, S.B. (2008) The Value of Nature: Ecological, Economic, Cultural and Social Benefits of Protected Areas. <i>Secretariat of the Convention on Biological Diversity</i> . Montreal, Quebec, Canada.
7. National Citrus Gene Sanctuary – Biosphere Reserve in the West Garo Hills	India	Genetic reserve network	Citrus (<i>Citrus indica</i> and <i>C. macroptera</i>)	– Singh, B. (1981) <i>Establishment of First Gene Sanctuary in India for Citrus in Garo Hills</i> . Concept Publishing Company, New Delhi. – Malik, S.K., Chaudhury, R., Dhariwal, O.P. and Kalia, R.K. (2006) Collection and Characterization of <i>Citrus indica</i> Tanaka and <i>C. macroptera</i> Montr.: Wild Endangered Species of Northeastern India. <i>Genetic Resources and Crop Evolution</i> , 53: 1485–1493.
8. Touran protected area	Iran	Genetic reserve network	Barley (<i>Hordeum</i> spp.)	– Asri, Y., Jalili, A., Asadi, M. and Dianatnezhad, H. (2000) <i>A contribution to the flora of Touran biosphere reserve</i> . PAJOUHESH-VA-SAZANDEGI J., pp. 4-19. – Kermani, F., Rayegani, B., Nezami, B., Goshtasb, H. and Khosravi, H. (2018) <i>Assessing the vegetation trends in arid and semi-arid regions (Case study: Touran Protected Area)</i> . <i>Desert Ecosystem Engineering Journal</i> , 6(17), 1–14 – UNESCO (2019) <i>Touran Biosphere Reserve, Islamic Republic of Iran</i> , viewed January 2020, en.unesco.org/biosphere/aspac/touran – Dornagasht Iran (2018) <i>Touran Biosphere Reserve</i> , Iran Paradise, viewed January 2020 iranparadise.com/touran-biosphere-reserve/ – Protected Planet (2020) <i>Touran in Iran (Islamic Republic Of)</i> , UNEP-WCMC IUCN, viewed January 2020 protectedplanet.net/touran-national-park
9. Ammiad Reserve Israel	Israel	Genetic reserve network	Wheat (<i>Triticum dicoccoides</i>)	– Singh, M. and Upadhyaya, H. D. (2016) <i>Genetic and Genomic Resources for Grain Cereals Improvement</i> . Academic Press, London. – Heywood, V. H. and Hunter, D. (2012) <i>Crop Wild Relatives: A Manual of in situ Conservation</i> . Routledge, London.
10. Majella National Park in Italy	Italy	Genetic reserve network	Brassica (<i>Brassica macrocarpa</i>)	– Majella National Park, Botanical Office and Majella Seed Bank. – Branca, F., Argento, S. and Tribulato, A. (2011) <i>Assessing genetic reserves in Sicily (Italy): the Brassica wild relatives case study</i> . In: Maxted, N., Dulloo, E., Ford-Lloyd, B.V., Frese, L., Iriondo, J. and Carvalho, A.P. (Eds.) <i>Agrobiodiversity Conservation: Securing the Diversity of Crop Wild Relatives and Landraces</i> . CABI International, Wallingford, pp. 52–58.
11. Besh-Aral State Nature Reserve	Kyrgyzstan	Genetic reserve network	Walnut (<i>Juglans regia</i>) and plum (<i>Prunus sogdiana</i>)	– Mulongoy, K.J. and Gidda, S.B. (2008) The Value of Nature: Ecological, Economic, Cultural and Social Benefits of Protected Areas. <i>Secretariat of the Convention on Biological Diversity</i> . Montreal, Quebec, Canada.

Table 1 (cont.). List of crop wild relative *in situ* conservation case studies.

Name	Country	Type of network	Crop (target CWR)	Bibliographic references / Web URL / Contact institution
12. In situ conservation of wild relatives of coffee	Mauritius	Genetic reserve network	Wild relatives of Coffee (<i>C.mauritiana</i> , <i>C. macrocarpa</i> and <i>C.myrtifolia</i>)	<ul style="list-style-type: none"> – Dulloo M.E. (1998). <i>Diversity and conservation of wild Coffea germplasm in the Mascarene Islands</i>. Ph.D. thesis, University of Birmingham, U.K. 225pp. – Dulloo M.E. (1998). Conserving diversity of wild plant genetic resources: a case study of wild Coffea taxa in the Mascarene Islands. IN: <i>Proceedings of 5th International Botanic Garden Conservation Congress</i> organised by the Botanic Garden Conservation Secretariat held at Kirstenbosch, Cape Town, South Africa, 14–18 September 1998. Botanic Gardens Conservation International and National Botanical Institute South Africa. – Dulloo M.E., Guarino L., Engelmann F., Maxted N., Newbury H.J., Attere F. and Ford Lloyd B.V. (1998). Complementary conservation strategies for the genus <i>Coffea</i>: a case study of Mascarene <i>Coffea</i> species. <i>Genetic Resources and Crop Evolution</i> 45: 565–579.
13. Sierra de Manantlán and maize and its wild relatives	Mexico	Genetic reserve network	Maize (<i>Zea diploperennis</i>)	<ul style="list-style-type: none"> – Contreras-Toledo, A.R., Cortés-Cruz, M., Costich, D.E., de Lourdes Rico-Arce, M., Brehm, J.M. and Maxted N. (2019) Diversity and conservation priorities of crop wild relatives in Mexico. <i>Plant Genetic Resources: Characterisation and Utilisation</i>, 17:140–150. – Graf, S.H., Santana, E., Jardel, E.J., Gómez, M. and García-Ruvalcaba, S. (2003) La Reserva de la Biosfera Sierra de Manantlán, México. In: Carabias, J. and Cadena, R. (Eds.) <i>Capacidades Necesarias para el Manejo de Áreas Protegidas: América Latina y el Caribe</i>. Redacta SA, Mexico, pp. 135–153. – UNESCO (2012a) <i>UNESCO–MAB Biosphere Reserves Directory. Biosphere Reserve Information: Mexico. Sierra de Manantlán. The MAB Programme. United Nations Educational, Scientific and Cultural Organization</i>. Available at: unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/latin-america-and-the-caribbean/mexico/sierra-de-manantlan/. – UNESCO (2012b) <i>UNESCO–MAB Segunda Revisión Periódica De La Reserva De La Biosfera Del Mab-Unesco Sierra De Manantlán, México</i>. Technical report. Available at: unesco.org/science/doc/mab/REPORTE%20PERIODICO%20DEL%20MAB%20SIERRA%20DE%20MANANTLAN%20_FIN.pdf
14. Wadi Sair Genetic Reserve, Hebron	Palestine	Genetic reserve network	Legumes (<i>Lens</i> spp., <i>Vicia</i> spp., <i>Lathyrus</i> spp.) and fruit trees (<i>Prunus</i> spp., <i>Pyrus</i> spp., <i>Pistacia</i> spp.)	<ul style="list-style-type: none"> – Al-Atawneh, N., Amri, A., Assi, R. and Maxted, N. (2008) Management plans for promoting <i>in situ</i> conservation of local agrobiodiversity in the West Asia centre of plant diversity. In: Maxted, N., Kell, S., Ford-Lloyd, B.V., Dulloo, E. and Iriondo, J. (Eds.) <i>Crop Wild Relative Conservation and Use</i>. CAB International, Wallingford, UK, pp. 340–363. – Maxted, N., Kell, S., Ford-Lloyd, B.V., Dulloo, E. and Iriondo, J. (Eds.) (2008) <i>Crop Wild Relative Conservation and Use</i>. CAB International, Wallingford, UK – Iriondo, J. M., Maxted, N. and Dulloo, M.E. (Eds.). (2008) <i>Conserving Plant Genetic Diversity in Protected Areas: Population Management of Crop Wild Relatives</i>. CABI, Wallingford. – Heywood, V.H. and Hunter, D. (2012) <i>Crop Wild Relatives: A Manual of in situ Conservation</i>. London, Routledge.
15. Biodiversity Micro-Reserves network	Portugal	Genetic reserve network	Endangered or rare CWR species	<ul style="list-style-type: none"> – Quercus (2010) <i>Custody of Nature in Portugal. IV National Journeys of Custody of the Territory</i>. Benia de Onís, Spain. Available at: https://www.slideshare.net/fapas/la-custodia-del-territorio-en-portugal-quercus-portugal-iv-ject-benia-de-ons-2010. – Quercus (2005) <i>Quercus apresenta Rede de Micro-Reservas Biológicas</i>, Quercus Associação Nacional de Conservação da Natureza, viewed April 2019, https://www.quercus.pt/comunicados/2005/abril/2063-quercus-apresenta-rede-de-micro-reservas-biologicas

Table 1 (cont.). List of crop wild relative *in situ* conservation case studies.

Name	Country	Type of network	Crop (target CWR)	Bibliographic references / Web URL / Contact institution
16. <i>Beta patula</i> genetic reserve	Portugal	Genetic reserve network	Beet (<i>Beta patula</i>)	<ul style="list-style-type: none"> – Carvalho, M.Â., Nóbrega, H., Freitas, G., Fontinha, S., and Frese, L. (2012) Towards the establishment of a genetic reserve for <i>Beta patula</i> Aiton. In: Maxted, N, Dulloo, E., Ford-Lloyd, B.V., Frese, L., Iriondo, J. and Carvalho, M.A.P. (Eds.) <i>Agrobiodiversity Conservation: Securing the Diversity of Crop Wild Relatives and Landraces Conservation</i>. CABI International, Wallingford, pp. 36–44. – Frese, L., Nachtigall, M., Enders, M. and Carvalho, M.Â. (2012) <i>Beta patula</i> Aiton: Genetic diversity analysis. In: Maxted, N, Dulloo, E., Ford-Lloyd, B.V., Frese, L., Iriondo, J. and Carvalho, M.A.P. (Eds.) <i>Agrobiodiversity Conservation: Securing the Diversity of Crop Wild Relatives and Landraces Conservation</i>. CABI International, Wallingford, pp. 45–51.
17. Plant Micro-Reserves network	Spain	Genetic reserve network	Endemic, endangered or rare CWR	<ul style="list-style-type: none"> – Laguna, E., Fos, S., Jiménez, J. and Volis, S. (2016) Role of micro-reserves in conservation of endemic, rare and endangered plants of the Valencian Region (Eastern Spain). <i>Israel Journal of Plant Sciences</i> 63: 320 – 332. – Rubio Teso, M.L., Torres, E., Parra-Quijano, M., De la Rosa, L., Fajardo, J. and Iriondo, J. (2018) National inventory and prioritization of crop wild relatives in Spain. <i>Genetic Resources and Crop Evolution</i> 65: 1237 – 1253.
18. <i>Sierra del Rincón</i> Biosphere Reserve	Spain	Genetic reserve network	15 CWR species of the priority Spanish CWR list	<ul style="list-style-type: none"> – Organismo Autónomo Parques Nacionales (2019) <i>In situ and ex situ conservation of crop wild relatives at the Sierra del Rincón Biosphere Reserve</i>. Bulletin of the Spanish Committee of the MaB Program and of the Spanish Network of Biosphere Reserves: 26th Edition. Available at: rerb.oapn.es/images/flippingbook/boletin_RERB_26.pdf.
19. <i>In Situ</i> Conservation of CWR in Sri Lanka	Sri Lanka	Genetic reserve network	Rice (<i>Oryza</i> spp.), banana (<i>Musa</i> spp.), cowpea (<i>Vigna</i> spp.), cinnamon (<i>Cinnamomum</i> spp.)	<ul style="list-style-type: none"> – Wijeratne, M. & Piyasiri, K.H.K.L., (2016) Conservation of crop wild relatives: a Sri Lankan experience in community participation. <i>Tropical Agricultural Research and Extension</i> 18(2), pp.87–93. – Ganashan, P., Balendra, S and Dassayanke, M.D. (1996) '<i>Sri Lanka</i>', <i>Country report to the FAO international technical conference on plant genetic resources</i>. FAO. Available at: fao.org/fileadmin/templates/agphome/documents/PGR/SoW1/asia/SRILANKA.pdf – Muthukuda Arachchi, D.H. and Wijerathne, P.M. (2008) '<i>Sri Lanka</i>', <i>Country report on the state of plant genetic resources for food and agriculture</i>. FAO. Available at: fao.org/3/i1500e/SriLanka.pdf
20. <i>In situ</i> conservation of forage plants genetic diversity	Switzerland	Genetic reserve network	17 CWR national prioritized species	<ul style="list-style-type: none"> – Federal Office for Agriculture (OFAG) (2019) <i>National action Plan RPGAA</i>, BLW, viewed October 2019, blw.admin.ch/blw/fr/home/nachhaltige-produktion/pflanzliche-produktion/pflanzengenetische-ressourcen/nap-pgrel.html. – Häner, R. and Schierscher, B. (2009) First step towards CWR conservation in Switzerland. <i>Crop wild relative</i>, 75: 14.
21. Sale-Rsheida Reserve	Syria	Genetic reserve network	Wheat (<i>Triticum dicoccoides</i>) and barley (<i>Hordeum</i> spp.)	<ul style="list-style-type: none"> – Al-Atawneh, N., Amri, A., Assi, R. and Maxted, N. (2008) Management plans for promoting <i>in situ</i> conservation of local agrobiodiversity in the West Asia centre of plant diversity. In: Maxted, N., Kell, S.P., Ford-Lloyd, B.V., Dulloo, E. and Iriondo, J. (Eds.) <i>Crop Wild Relative Conservation and Use</i>. CABI International, Wallingford, UK, pp. 340–363.
22. Ceylanpinar State Farm	Turkey	Genetic reserve network	Wheat (<i>Aegilops</i> spp. and <i>Triticum</i> spp.)	<ul style="list-style-type: none"> – Karagöz, A. (1998) <i>In situ</i> conservation of plant genetic resources in Ceylanpinar State Farm. In: Zencirci, N., Kaya, Z., Anikster, Y. and Adams, W.T. (Eds.) <i>The Proceedings of the International Symposium on In situ Conservation of Plant Genetic Diversity</i>. CRIFC, Ankara, Turkey, pp. 87–91. – Iriondo, J.M., Maxted, N. and Dulloo, M.E. (Eds.) (2008) <i>Conserving Plant Genetic Diversity in Protected Areas: Population Management of Crop Wild Relatives</i>. CABI, Wallingford. – Heywood, V.H. and Hunter, D. (2012). <i>Crop Wild Relatives: A Manual of in situ Conservation</i>. Routledge, London.

Table 1 (cont.). List of crop wild relative *in situ* conservation case studies.

Name	Country	Type of network	Crop (target CWR)	Bibliographic references / Web URL / Contact institution
23. Kasdagi National Park	Turkey	Genetic reserve network	Plum (<i>Prunus divaricata</i>) and chestnut (<i>Castanea sativa</i>)	<ul style="list-style-type: none"> – Tan, A. (1998) Current status of plant genetic resources conservation in Turkey. In: Zencirci, N., Kaya, Z., Anikster, Y. and Adams, W.T. (Eds.) <i>International Symposium on In Situ Conservation of Plant Diversity</i>. Central Research Institute for Field Crops, Ankara, Turkey, pp. 5–16. – Tan, A. and Tan, A. S. (2002) In situ conservation of wild species related to crop plants: the case of Turkey. In: Engels, J.M.M., Ramantha Rao, V., Brown, A.H.D. and Jackson, M.T. (Eds.) <i>Managing Plant Genetic Diversity</i>. CABI International, Wallingford, pp. 195–204. – Macted, N., Magos Brehm, J. and Kell, S. (2013) <i>Resource Book for Preparation of National Conservation Plans for Crop Wild Relatives and Landraces</i>. Food and Agriculture Organization of the United Nations, Italy. – Heywood, V. H. and Hunter, D. (2012) <i>Crop Wild Relatives: A Manual of in situ Conservation</i>. London, Routledge.
24. Bolkar Mountains	Turkey	Genetic reserve network	Chestnut (<i>Castanea sativa</i>)	<ul style="list-style-type: none"> – Müller-Starck, G. and Schubert, R. (Eds.). (2013) <i>Genetic Response of Forest Systems to Changing Environmental Conditions</i>. Springer Science & Business Media, Berlin. – Tan, A. (1998) Current status of plant genetic resources conservation in Turkey. In: Zencirci, N., Kaya, Z., Anikster, Y. and Adams, W.T. (Eds.) <i>International Symposium on In Situ Conservation of Plant Diversity</i>. Central Research Institute for Field Crops, Ankara, Turkey, pp. 5–16. – Tan, A. and Tan, A.S. (2002) In situ conservation of wild species related to crop plants: the case of Turkey. In: Engels, J.M.M., Ramantha Rao, V., Brown, A.H.D. and Jackson, M.T. (Eds.) <i>Managing Plant Genetic Diversity</i>. CABI International, Wallingford, pp. 195–204.,
25. Beydaglari Coast National Park	Turkey	Genetic reserve network	Faba bean (<i>Vicia eristalioides</i>)	<ul style="list-style-type: none"> – Mulongoy, K.J. and Gidda, S.B. (2008) <i>The Value of Nature: Ecological, Economic, Cultural and Social Benefits of Protected Areas</i>. Secretariat of the Convention on Biological Diversity. Montreal, Quebec, Canada. – Macted, N., Magos Brehm, J. and Kell, S. (2013) <i>Resource Book for Preparation of National Conservation Plans for Crop Wild Relatives and Landraces</i>. FAO of the United Nations, Italy.
26. Central-Southeast USA (Witchita Mountains and Ouachita National Forest, Oklahoma, Clifty Creek, Missouri)	United States of America	Genetic reserve network	Grape vine (<i>Vitis rupestris</i> , <i>V. shuttleworthii</i> and <i>V. monticola</i>)	<ul style="list-style-type: none"> – Pavek, D.S., Lamboy, W.F. and Garvey, E.J. (1999) <i>Ecogeographic Study of Vitis Species: Final Report for Caloosa and Sweet Mountain Grapes</i>. Unpublished technical report, USDA Pullman. – Khoury, C.K., Greene, S., Wiersema, J., Macted, N., Jarvis, A. and Struik, P.C. (2013) An inventory of crop wild relatives of the United States. <i>Crop Science</i>, 53(4), 1496–1508.
27. Coronado National Forest	United States of America	Genetic reserve network	Pepper (<i>Capsicum annuum</i> var. <i>glabriusculum</i>)	<ul style="list-style-type: none"> – Horst, T. (2001) <i>Native Seeds/SEARCH Tradition and Conservation</i>. <i>Cult Resour Manag</i>, 4: 23–26. – Khoury, C.K. and Nabhan, G.P. (2019) <i>Conservation & use of crop wild relatives in Arizona</i>. In: C. K. Khoury & G. P. Nabhan, Eds. – U.S. Forest Service (2019) <i>Chiltepine or Bird Pepper (Capsicum annuum var. glabriusculum)</i>, United States Department of Agriculture, viewed October 2019, fs.fed.us/wildflowers/beauty/Sky_Islands/plants/Capsicum_annuum/index.shtml – U. S. Forest Service (2019) <i>Chiltepin Pepper: “the mother of all peppers”</i>, United States Department of Agriculture, viewed October 2019, fs.fed.us/wildflowers/ethnobotany/wildrelatives.shtml – U. S. Forest Service (2020) <i>Welcome to the Coronado National Forest</i>, Coronado National Forest, viewed January 2020, fs.usda.gov/coronado/

Table 1 (cont.). List of crop wild relative *in situ* conservation case studies.

Name	Country	Type of network	Crop (target CWR)	Bibliographic references / Web URL / Contact institution
28. Great Basin, Washington State	United States of America	Genetic reserve network	Onion (<i>Allium columbianum</i> , <i>A. geyeri</i> and <i>A. fibrillum</i>)	<ul style="list-style-type: none"> – Hellier, B.C. (2000) <i>Genetic, morphologic, and habitat diversity of two species of Allium native to the Pacific Northwest, USA and their implications for in situ seed collection for the National Plant Germplasm System</i>. MSc thesis. Washington State University, Pullman (WA). – Pavek, S. D., Garvey, N. J., Lamboy, W. F., Hellier, B. C. and Bamberg, J. B. (1998) <i>Where the Wild Things Are-In situ Plant Preservation</i>. <i>Agricultural Research</i>, 46(12):4-8.
29. Nevada	United States of America	Genetic reserve network	Indian and red pea (<i>Lathyrus</i> spp.)	<ul style="list-style-type: none"> – Eldredge, E. P. (2011) <i>Plant fact sheet for Nevada pea (Lathyrus lanszwertii)</i>. USDA - Natural Resources Conservation Service, Great Basin Plant Materials Center. Fallon, Nevada 89406. – Khoury, C.K., Greene, S., Wiersema, J., Maxted, N., Jarvis, A. and Struik, P.C. (2013) <i>An inventory of crop wild relatives of the United States</i>. <i>Crop Science</i>, 53:1496-1508.
30. Organ Pipe Cactus National Monument	United States of America	Genetic reserve network	Pepper (<i>Capsicum annuum</i> L. var. <i>glabriusculum</i>)	<ul style="list-style-type: none"> – Greenwald, N., Segee, B., Curry, T. and Bradley, C. (2017) <i>A Wall in The Wild: The Disastrous Impacts of Trump's Border Wall on Wildlife</i>. <i>Cent Biol Divers</i>, (May). – Meierotto, L. (2020) <i>Immigration, Environment, and Security on the U.S.-Mexico Border</i>. Palgrave Macmillan, Cham. – National Park Service (2020) <i>Organ Pipe Cactus National Monument</i>, U.S. National Park Service, viewed January 2020, nps.gov/orpi/index.htm – UNESCO (2005) <i>Biosphere Reserve Information. United States of America: ORGAN PIPE CACTUS</i>, MAB Biosphere Reserves Directory, viewed January 2020, unesco.org/mabdb/br/brdir/directory/biores.asp?mode=all&code=usa+18
31. Nurata Mountain Walnut State Reserve	Uzbekistan	Genetic reserve network	Walnut (<i>Juglans regia</i>)	<ul style="list-style-type: none"> – UNEP (2011) <i>In Situ/On Farm Conservation and Use of Agricultural Biodiversity (Horticultural Crops and Wild Fruit Species) in Central Asia</i>. Project (GEF/UNEP/FAO). Available at: thegef.org/project/situon-farm-conservation-and-use-agricultural-biodiversity-horticultural-crops-and-wild – Heywood, V. H. and Hunter, D. (2012) <i>Crop Wild Relatives: A Manual of in situ Conservation</i>. Routledge, London.
32. <i>In situ</i> Conservation of Crop Wild Relatives Uzbekistan	Uzbekistan	Genetic reserve network	Onion (<i>Allium</i> spp.), apples (<i>Malus</i> spp.), pistachio (<i>Pistacia</i> spp.), almond (<i>Amygdalus</i> spp.) and barley (<i>Hordeum</i> spp.).	<ul style="list-style-type: none"> – Heywood, V. H. and Hunter, D. (2012) <i>Crop Wild Relatives: A Manual of in situ Conservation</i>. Routledge, London. – UNEP (2011) <i>In Situ/On Farm Conservation and Use of Agricultural Biodiversity (Horticultural Crops and Wild Fruit Species) in Central Asia</i>. Project (GEF/UNEP/FAO). Available at: thegef.org/project/situon-farm-conservation-and-use-agricultural-biodiversity-horticultural-crops-and-wild
33. Gene Management Zone in Huu Lien Nature Reserve, Lang Son Province	Vietnam	Genetic reserve network	Taro (<i>Colocasia</i> spp.), rice (<i>Oryza</i> spp.), citrus trees (<i>Citrus</i> spp.) and rice bean (<i>Vigna umbellata</i>)	<ul style="list-style-type: none"> – Iriondo, J. M., Maxted, N. and Dulloo, M.E. (Eds.) (2008) <i>Conserving Plant Genetic Diversity in Protected Areas: Population Management of Crop Wild Relatives</i>. CABI, Wallingford. – Heywood, V. H. and Hunter, D. (2012) <i>Crop Wild Relatives: A Manual of in situ Conservation</i>. Routledge, London.
34. Ngoc Hoi	Vietnam	Genetic reserve network	Citrus trees (<i>Citrus</i> spp.) and rice (<i>Oryza</i> spp.)	<ul style="list-style-type: none"> – Iriondo, J. M., Maxted, N. and Dulloo, M.E. (Eds.) (2008) <i>Conserving Plant Genetic Diversity in Protected Areas: Population Management of Crop Wild Relatives</i>. CABI, Wallingford. – Heywood, V. H. and Hunter, D. (2012) <i>Crop Wild Relatives: A Manual of in situ Conservation</i>. Routledge, London.

Table 1 (cont.). List of crop wild relative *in situ* conservation case studies.

Name	Country	Type of network	Crop (target CWR)	Bibliographic references / Web URL / Contact institution
35. <i>In-situ</i> Conservation of Crop Wild Relatives Bolivia	Bolivia	Potential genetic reserve network	Crop wild relatives from the genera: <i>Anacardium</i> , <i>Ananas</i> , <i>Annona</i> , <i>Arachis</i> , <i>Bactris</i> , <i>Carica</i> , <i>Capsicum</i> , <i>Chenopodium</i> , <i>Cyphomandra</i> , <i>Euterpe</i> , <i>Ipomea</i> , <i>Manihot</i> , <i>Phaseolus</i> , <i>Rubus</i> , <i>Solanum</i> , <i>Theobroma</i>	<ul style="list-style-type: none"> – UNEP (2010) <i>In-situ Conservation of Crop Wild Relatives through Enhanced Information Management and Field Application</i>. Project (GEF/UNEP/FAO). Available at: thegef.org/project/situ-conservation-crop-wild-relatives-through-enhanced-information-management-and-field – Heywood, V. H. and Hunter, D. (2012) <i>Crop Wild Relatives: A Manual of in situ Conservation</i>. Routledge, London. – Gonzalez Paredes, C. (2011) <i>Conservation of Crop Wild Relative Species in Bolivia. An Outline to Identify Favorable and Unfavorable Factors to Support a Conservation Program</i>. Master's thesis of Arizona State University. Available at: repository.asu.edu/attachments/56564/content/GonzalezParedes_asu_0010N_10615.pdf
36. UK CWR <i>In situ</i> Network	United Kingdom	Potential genetic reserve network	148 CWR of the UK priority list	<ul style="list-style-type: none"> – Fielder, H., Brotherton, P., Hosking, J., Hopkins, J.J., Ford-Lloyd, B.V. and Maxted, N. (2015) Enhancing the conservation of crop wild relatives in England. <i>Plos One</i> 10(6): e0130804. – Hopkins, J. & Maxted, N., (2010) <i>Crop Wild Relatives: Plant Genetic Conservation for Food Security</i>. Natural England, Peterborough.
37. Corcovado National Park	Costa Rica	Potential genetic reserve network	Avocado (<i>Persea spp.</i>)	<ul style="list-style-type: none"> – Mulongoy, K.J. and Gidda, S.B. (2008) The Value of Nature: Ecological, Economic, Cultural and Social Benefits of Protected Areas. <i>Secretariat of the Convention on Biological Diversity</i>. Montreal, Quebec, Canada. – Maxted, N., Magos Brehm, J. and Kell., S. (2013) <i>Resource Book for Preparation of National Conservation Plans for Crop Wild Relatives and Landraces</i>. Food and Agriculture Organization of the United Nations, Italy. – Heywood, V. H. and Hunter, D. (2012) <i>Crop Wild Relatives: A Manual of in situ Conservation</i>. Routledge, London.
38. <i>Phaseolus</i> CWR <i>in situ</i> conservation in Costa Rica	Costa Rica	Potential genetic reserve network	Bean (<i>Phaseolus spp.</i>)	<ul style="list-style-type: none"> – Baudoin, J.P., Rocha, O.J., Degreef, J., Zoro, Ni, I., Ouédraogo, M., Guarino, L. and Toussaint, A. (2008) <i>In situ</i> conservation strategy for wild Lima bean (<i>Phaseolus lunatus</i> L.) populations in the Central Valley of Costa Rica: A case study of short-lived perennial plants with a mixed mating system. In: Maxted, N., Kell, S., Ford-Lloyd, B.V., Dulloo, E. and Iriondo, J. (Eds.) <i>Crop Wild Relative Conservation and Use</i>. CAB International, Wallingford, UK, pp. 364-379. – Villalobos, R. A. <i>et al.</i> (2001) Observations on the geographic distribution, ecology and conservation status of several <i>Phaseolus</i> bean species in Costa Rica. <i>Genetic Resources and Crop Evolution</i>, 48:221–232.
39. Protecting <i>Brassica macrocarpa</i> Guss. (a <i>Brassica oleracea</i> L. CWR) in Favignana (Egadi Island, Sicily, Italy)	Italy	Potential genetic reserve network	Brassica (<i>Brassica macrocarpa</i>)	<ul style="list-style-type: none"> – Maggioni, L. and Lipman, E. (2010). Report of an ECPGR working group on <i>Brassica</i>. Fourth Meeting, Italy, pp. 2-4. – Branca, F. and Cartea, E. (2011). <i>Brassica</i>. In: Kole, C. (Ed.) <i>Wild crop relatives: Genomic and breeding resources: Cereals</i>. Springer Science & Business Media, Berlin, pp. 17-36.

Table 1 (cont.). List of crop wild relative *in situ* conservation case studies.

Name	Country	Type of network	Crop (target CWR)	Bibliographic references / Web URL / Contact institution
40. Research study for <i>in situ</i> conservation of <i>Beta nana</i> in alpine areas of Greece	Greece	Potential genetic reserve network	Beta (<i>Beta nana</i>)	<ul style="list-style-type: none"> – Dale, M.F.G. (1981) <i>Report on 1981 Collection of B. nana in Greece (Supplement to 1980 report)</i>. Copy available at the Greek Gene Bank, Thessaloniki, Greece. – Frese, L., Hannan, R., Hellier, B., Samaras, S. and Panella, L. (2009). Survey of <i>Beta nana</i> in Greece. p. 45-52. In: L. Frese, L. Maggioni and E. Lipman (ed.) <i>Report of a Working Group on Beta and the World Beta Network</i>. Third Joint Meeting, 8-11 March 2006, Puerto de la Cruz, Tenerife, Spain. Bioversity International, Rome, Italy – Stavropoulos, N., Samaras, S., Matheou, A., Ralli, P., Kotali, E., Tsivelikas, A., Gatzelaki, C., Ninou, E., Mylonas, I., Psarra, E., Ganitis, G. and Stathi, A. (2008) <i>Crop wild relatives' in situ conservation in Greece</i>. In: <i>Report of NAGREF, Greek Genebank, for Measure 6.3 Action B of the Operational Programme for the Agricultural Development and Reform of the Countryside</i>. Thessaloniki (In Greek).
41. CWR Russia	Russia	Potential genetic reserve network	Burclover (<i>Medicago</i> spp.)	<ul style="list-style-type: none"> – Greene, S., Afonin, A. and Dzyubenko, N. (2010) Conference Information: <i>Crop wild relatives of Medicago in Russia and neighbouring countries</i>. In: <i>Symposium Towards the establishment of genetic reserve for crop wild relatives and landraces in Europe</i>. University of Madeira, Funchal (Portugal). – Afonin, A. N., Greene, S L., Dzyubenko, I. and Frolov, A. N. (2008) <i>Interactive Agricultural Ecological Atlas of Russia and Neighboring Countries</i>, Economic Plants and their Diseases, Pest and Weeds, viewed October 2019, agroAtlas.ru/
42. The wild vine. An important phylogenetic resource without legal protection in Spain	Spain	Potential genetic reserve network	Grape (<i>Vitis</i> spp.)	<ul style="list-style-type: none"> – Lara, M., Iriarte-Chiapusso, M.J., Cantos, M., Garcia Jimenez, J.L., Morales, R., Ocete, C.A., ... and Iniguez, M. (2017) The wild vine. An important phylogenetic resource without legal protection in Spain. <i>Rivar Revista Iberoamericana de Viticultura, Agroindustria y Ruralidad</i>, 4: 45-68. – Rodríguez, Á., Hidalgo, J., Arrimadas, J., Alvar-Ocete, C., Duhart, F., Ocete, R., ... and Valle, J.M. (2016) El impacto antrópico sobre la vid silvestre en el territorio de Lapurdi (suroeste de Francia). <i>Munibe Ciencias Naturales. Natur Zientziak</i>, 64:79-98.

Table 1 (cont.). List of crop wild relative *in situ* conservation case studies.

Name	Country	Type of network	Crop (target CWR)	Bibliographic references / Web URL / Contact institution
43. Informal Nordic Crop Wild Relative Network	Multi-country (Denmark, Finland, Iceland, Norway, Sweden)	People and institutions network	Forages, berries and several crop species.	<ul style="list-style-type: none"> – Fitzgerald, H., Aronsson, M., Asdal, Å., Endresen, D., Kiviharju, E., Lund, B., Palmé, A., Rasmussen, M., Weibull, J., and Porbjörnsson, H. (2017) The Nordic priority crop wild relative gene pool and distribution dataset. – Fitzgerald, H., Palmé, A., Asdal, Å., Endresen, D., Kiviharju, E., Lund, B., Rasmussen, M., Porbjörnsson, H., & Weibull, J. (2019) A regional approach to Nordic crop wild relative <i>in situ</i> conservation planning. <i>Plant Genetic Resources: Characterization and Utilization.</i>, pp. 1-12 – Kiviharju, E., Fitzgerald, H., and Eisto, K. (2018) <i>Vilejelykasvien Luonnonvaraiset Sukulaiskajit (CWR) ja niiden monimuotoisuuden suojele</i>. Available at: luke.fi/wp-content/uploads/2019/01/viljelykasvien-luonnonvaraiset-sukulaiskajit-CWR-esite.pdf – Palmé, A., Fitzgerald, H., Weibull, J., Bjureke, K., Eisto, K. and Endresen, D. (2019) <i>Nordic Crop Wild Relative conservation</i>. Technical report from two collaborative projects 2015–2019. Copenhagen: Nordisk Ministerråd (TemaNord). – Palmé, A., Asdal, Å., Endresen, D., Fitzgerald, H., Kiviharju, E., Lund, B., Rasmussen, M., Thorbjörnsson, H. and Weibull, J. (2019) <i>Policy Brief - crop wild relatives: actions needed to assure conservation of an important genetic resource</i>. Figshare. – Fitzgerald, H. and Helpdesk, G. N. (2018) <i>Nordic Crop Wild Relative (CWR) Checklist. Version 1.11. Nordic Genetic Resource Center (NORDGEN)</i>. Checklist dataset, viewed October 2019.
44. Irish Crop Wild Relative Database	Ireland	People and institutions network	102 wild species relatives to crops selected from Annex 1 of the International Treaty on Plant Genetic Resources for Food and Agriculture.	<ul style="list-style-type: none"> – National Biodiversity Data Centre (2016) <i>Irish Crop Wild Relative Database</i>. Occurrence dataset, viewed October 2019, doi.org/10.15468/lohime
45. ECPGR Wild Species Conservation in Genetic Reserves Working Group	Multi-country (Europe)	People and institutions network	European wild species relatives to crops	<ul style="list-style-type: none"> – ECPGR Wild Species Conservation Working Group (2019) <i>Wild Species Conservation in Genetic Reserves</i>, ECPGR-CGIAR, viewed October 2019, ecpgr.cgiar.org/working-groups/wild-species-conservation/ – Maxted, N., Avagyan, A., Frese, L., Iriondo, J.M., Magos Brehm, J., Singer, A. and Kell, S.P. (2015) <i>ECPGR Concept for in situ conservation of crop wild relatives in Europe</i>. Wild Species Conservation in Genetic Reserves Working Group, European Cooperative Programme for Plant Genetic Resources, Rome, Italy.
46. <i>In-Situ</i> Conservation of Andean Crops and their Wild Relatives in the Humahuaca Valley, the Southernmost Extension of the Central Andes (Argentina)	Argentina	Networks associated to projects	Potatoes (<i>Solanum</i> spp.), oca (<i>Oxalis</i> spp.), cañahua (<i>Chenopodium</i> spp.), ataco (<i>Amaranthus</i> spp.), and peppers (<i>Capsicum</i> spp.)	<ul style="list-style-type: none"> – UNDP (2013) <i>In-Situ Conservation of Andean Crops and their Wild Relatives in the Humahuaca Valley, the Southernmost Extension of the Central Andes</i>. Project (GEF). Available at: thegef.org/project/situ-conservation-andean-crops-and-their-wild-relatives-humahuaca-valley-southernmost – Heywood, V. H. and Hunter, D. (2012) <i>Crop Wild Relatives: A Manual of in situ Conservation</i>. Routledge, London.

Table 1 (cont.). List of crop wild relative *in situ* conservation case studies.

Name	Country	Type of network	Crop (target CWR)	Bibliographic references / Web URL / Contact institution
47. Conservation and Sustainable Utilization of Wild Relatives of Crops	China	Networks associated to projects	Soybean (<i>Glycine</i> spp.), wheat (<i>Triticum</i> spp.) and rice (<i>Oryza</i> spp.)	<ul style="list-style-type: none"> – UNDP (2015) <i>Conservation and Sustainable Utilization of Wild Relatives of Crops (resubmission from Feb 2006 IWP)</i>. Project (GEF/UNEP). Available at: thegef.org/project/conservation-and-sustainable-utilization-wild-relatives-crops-resubmission-feb-2006-iwp – Kell, S., Qin, H., Chen, B., Ford-Lloyd, B., Wei, W., Kang, D., & Maxted, N. (2015) China's crop wild relatives: Diversity for agriculture and food security. <i>Agriculture, Ecosystems & Environment</i>, (209), 138-154. – cn.undp.org/content/china/en/home/operations/projects/environment_and_energy/undp-gef-conservation-and-sustainable-utilization-of-wild-relati.html – Heywood, V. H. and Hunter, D. (2012) <i>Crop Wild Relatives: A Manual of in situ Conservation</i>. Routledge, London.
48. Research study for <i>in situ</i> conservation of <i>Crocus cartwrightianus</i> in Cyclades and Crete islands	Greece	Network associated to projects	Saffron (<i>Crocus cartwrightianus</i>)	<ul style="list-style-type: none"> – Ralli P. (2015) <i>Evaluation of genetic material of wild species and cultivated Crocus (Crocus spp.) based on agronomic characteristics and molecular techniques</i>. PhD thesis, Aristotle University of Thessaloniki (In Greek). – Ralli, P. and Dordas, C. (2012) <i>In situ</i> conservation of <i>Crocus cartwrightianus</i> in Cyclades and Crete. In: N. Maxted, E.M. Dulloo, B.V. Ford-Lloyd, L. Frese, J.M. Iriondo and M.A. Pinheiro de Carvalho (Eds.), <i>Agrobiodiversity Conservation: Securing the Diversity of Crop Wild Relatives and Landraces</i> (pp. 96–102). Croydon: CABI Publishing, Croydon. – Stavropoulos, N., Samaras, S., Matheou, A., Ralli, P., Kotali, E., Tselikas, A., Gatzelaki, C., Ninou, E., Mylonas, I., Psarra, E., Ganitis, G. and Stathi, A. (2008) <i>Crop wild relatives' in situ conservation in Greece</i>. In: <i>Report of NAGREF, Greek Genebank, for Measure 6.3 Action B of the Operational Programme for the Agricultural Development and Reform of the Countryside</i>. Thessaloniki (In Greek). – Traka-Mavrona, E., Ninou, E., Mylonas, I., Avdikos, I., Ralli, P., Krommydas, K., Koutsika-Sotiriou, M., Vogiatzis, D., Bletsos, F., Drosou, I. and Tselikas, A. (2015) <i>Enhancement of the agronomic value of Santorinis' landraces: "Tomataki", "Fava", "Zafora", "Cappari", "Aspri melitzana"</i>. In: <i>Report of the Hellenic Agricultural Organization-DEMETER</i>. Thessaloniki (In Greek)
49. Adapting Agriculture to Climate Change: Collecting, Protecting and Preparing Crop Wild Relatives	Multi-country	Networks associated to projects	Wild relatives of 29 priority crops, selected based on their importance and occurrence on Annex 1 of the International Treaty on Plant Genetic Resources for Food and Agriculture	<ul style="list-style-type: none"> – Crop Wild Relatives (2019) <i>The CWR Project</i>, Crop Wild Relatives, viewed October 2019, cwrdiversity.org/project/
50. Safeguarding Mesoamerican CWR	Multi-country (El Salvador, Guatemala, Honduras, Mexico)	Networks associated to projects	269 taxa of crop wild relatives	<ul style="list-style-type: none"> – Tobón, W. Urquiza-Haas, T., Yanes, A. M., Robayo, A. C., Restrepo, M. O., Urquiza-Haas, E., ... and Osorio, P. K. (2019) Mesoamerica's Crop Wild Relatives: A new approach for conservation planning. <i>Biodiversity Information Science and Standards</i>. Conference Abstract.

Table 1 (cont.). List of crop wild relative *in situ* conservation case studies.

Name	Country	Type of network	Crop (target CWR)	Bibliographic references / Web URL / Contact institution
51. SADC CWR Project "In situ conservation and use of crop wild relatives in three ACP countries of the SADC region"	Multi-country (Malawi, Tanzania, Zambia)	Networks associated to projects	SADC priority CWR and national priority CWR	– SADC Crop Wild Relatives (2016) <i>Enhancing the link between in situ conservation and use of crop wild relatives (CWR) in the SADC region to underpin regional food security and mitigate predicted adverse impact of climate change</i> , Crop Wild Relatives, viewed October 2019 cropwildrelatives.org/sadc-cwr-project/
52. SADC CWR Network– Bridging agriculture and environment: Southern African CWR regional network	Multi-country (Malawi, Tanzania, Zambia)	Networks associated to projects	SADC priority CWR and national priority CWR	– SADC CWR Network (2019) <i>Bridging agriculture and environment: Southern Africa crop wild relative regional network</i> , Crop Wild Relatives, viewed October 2019, cropwildrelatives.org/sadc-cwr-net/
53. Conservation and Use of Agricultural Biodiversity (Horticultural Crops and Wild Fruit Species)	Multi-country (India, Indonesia, Malaysia, Thailand)	Networks associated to projects	Apple (<i>Malus</i> spp.), pear (<i>Pyrus</i> spp.), plum (<i>Prunus</i> spp.), almond (<i>Amygdalus</i> spp.), pomegranate (<i>Punica granatum</i>), grape (<i>Vitis</i> spp.), etc.	– UNEP (2011) <i>In Situ/On Farm Conservation and Use of Agricultural Biodiversity (Horticultural Crops and Wild Fruit Species) in Central Asia</i> . Project (GEF/UNEP/FAO). Available at: thegef.org/project/situon-farm-conservation-and-use-agricultural-biodiversity-horticultural-crops-and-wild – Heywood, V. H. and Hunter, D. (2012) <i>Crop Wild Relatives: A Manual of in situ Conservation</i> . Routledge, London.
54. CARE MEDIFLORA project–"Conservation Actions for Threatened Mediterranean Island Flora: ex situ and in situ joint actions"	Multi-country (Spain, France, Italy, Greece, Cyprus)	Networks associated to projects	15 threatened Mediterranean CWR plant taxa	– Care Mediflora (2019) <i>Conservation Actions for Threatened Mediterranean Island Flora: ex situ and in situ joint actions</i> , Care-Mediflora, viewed October 2019, care-mediflora.eu/ – Kyratzis, A. (2018) <i>Ex situ conservation actions of the project "CARE-MEDIFLORA"</i> . In: 2 nd Mediterranean Plant Conservation Week, Malta. Available at: medplantsweek.uicnmed.Ed.org/public_html/medplantsweek/wp-content/uploads/2018/11/MPCW-Ex-situ-present-caremediflora.pdf
55. <i>In situ</i> Conservation of native cultivars and their wild relatives	Peru	Networks associated to projects	Potato (<i>Solanum</i> spp.), sweet potato (<i>Ipomea</i> spp.), etc.	– Angé, O. (2018) Interspecies respect and potato conservation in the Peruvian cradle of domestication. <i>Conservation and Society</i> , 16(1), 30. – Heywood, V. H. and Hunter, D. (2012). <i>Crop Wild Relatives: A Manual of in situ Conservation</i> . Routledge, London. – IPCCA (2019) <i>Parque de la Papa – Cusco Peru</i> , Indigenous Peoples Biocultural Climate Change Assessment Initiative, viewed October 2019, https://ipcca.info/about-parque-de-la-papa
56. Kibale Forest Wild Coffee Project	Uganda	Networks associated to projects	Coffee (<i>Coffea</i> spp.)	– Lilieholm, R.J. and Weatherly, W.P. (2010) Kibale forest wild coffee: challenges to market-based conservation in Africa. <i>Conservation Biology</i> , 24(4), pp. 924–930. – Kasenene, J. (1998) Forest Association and Phenology of Wild Coffee in Kibale National Park, Uganda., <i>African Journal of Ecology</i> , 36:241–250. – Heywood, V. H. and Hunter, D. (2012) <i>Crop Wild Relatives: A Manual of in situ Conservation</i> . Routledge, London.

Table 1 (cont.). List of crop wild relative *in situ* conservation case studies.

Name	Country	Type of network	Crop (target CWR)	– Bibliographic references / Web URL / Contact institution
57. Chatkal Biosphere Reserve	Uzbekistan	Networks associated to projects	Almond (<i>Amygdalus bucharica</i>)	<ul style="list-style-type: none"> – UNEP (2010), <i>In-situ Conservation of Crop Wild Relatives through Enhanced Information Management and Field Application</i>. Project (GEF/UNEP/FAO). Available at: thegef.org/project/situ-conservation-crop-wild-relatives-through-enhanced-information-management-and-field – Brandolini, G. V. (2013) Terminal Evaluation of the UNEP GEF Project <i>In situ Conservation of Crop Wild Relatives through Enhanced Information Management and Field Application</i>. – Bioversity International (2011) <i>Management Plan for Amygdalus bucharica in the Chatkal Biosphere State Reserve, Uzbekistan</i>. Technical report, available at: bioversityinternational.org/fileadmin/user_upload/online_library/publications/pdfs/Crop_wild_relatives/3.annex_Uzbekistan_management_plan.pdf