# FARMERS' USE AND PREFERENCES OF TREES IN KURDISTAN REGION OF IRAQ

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## INTRODUCTION

➢ Trees play a crucial role in most terrestrial ecosystems. They give an extensive range of outputs and facilities to rural and urban population [1].

➢ Erbil province located north of Iraq (Kurdistan Region), with Hot-Mediterranean Climate [2].

➢ Fruit production is a significant agricultural activity. The most frequently grown fruit tree is apple (*Malus pumila*), windbreaks (eucalyptus – *Eucalyptus camaldulensis*) and shading (mulberry - *Morus alba*) [3].

➢ Further warming climate predicted over most land regions during the next 50 years [4].

➢ The purpose of study was to identify the most used and preferred tree species among local farmers around Erbil city.

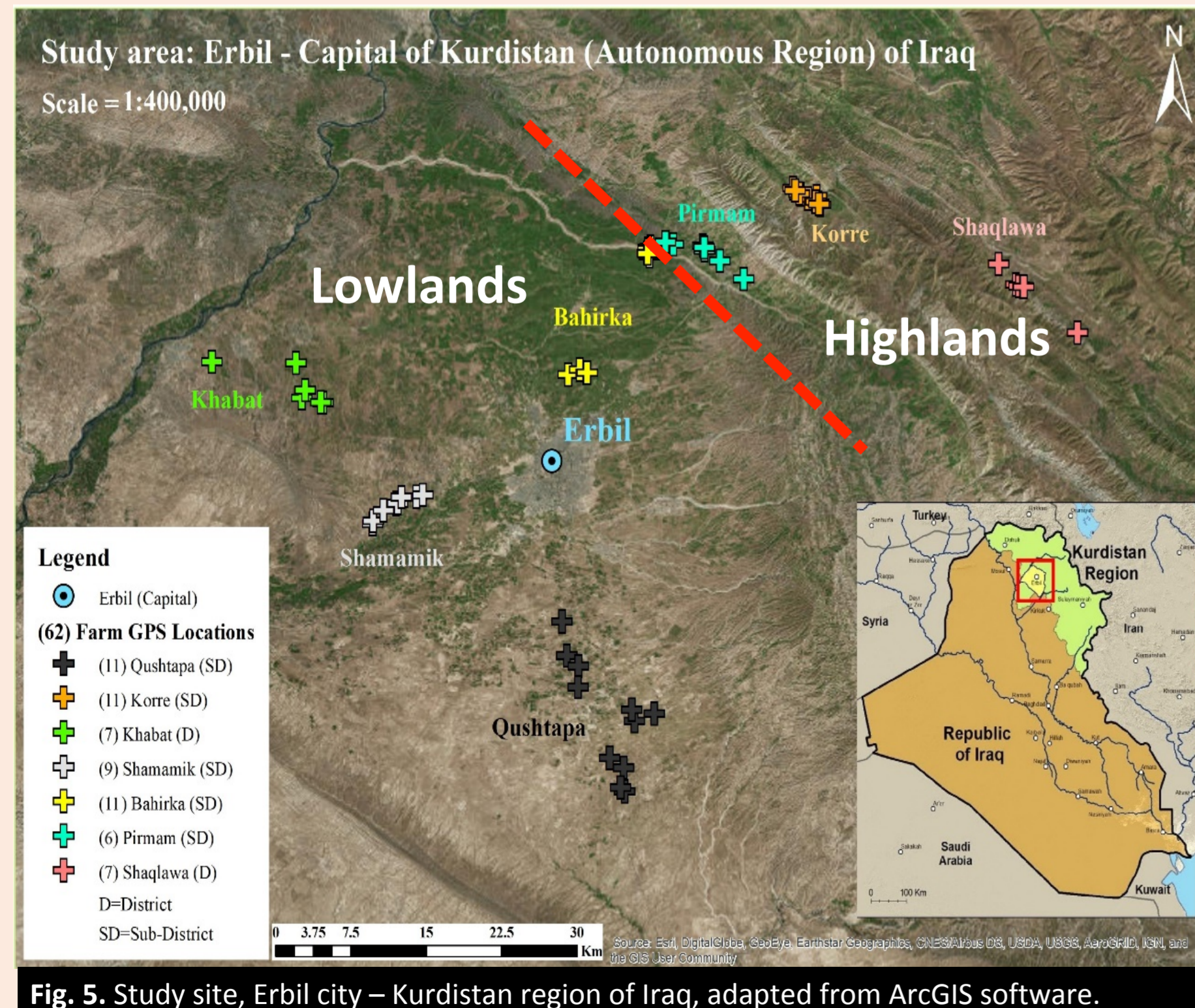**Fig. 1.** Pomegranates     **Fig. 2.** Olives     **Fig. 3.** Loquat tree
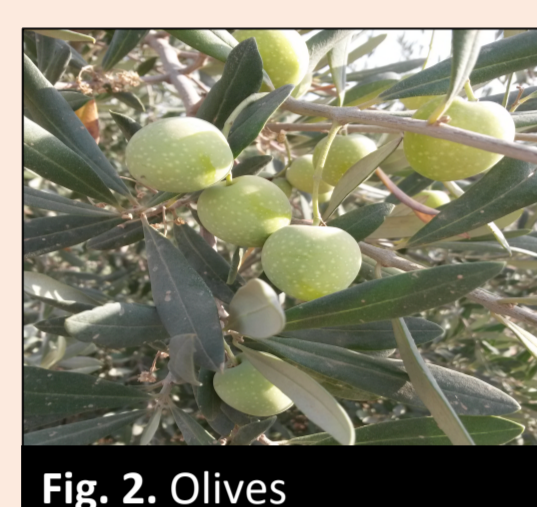
## OBJECTIVES

➢ to identify the most important tree species, their uses and preferences among small-scale farmers around the Erbil city in Kurdistan region of Iraq.

➢ Ranking of priority tree species recorded in the field observation by farmers and their current abundance were also assessed.

## METHODOLOGY

➢ The term (Tree) in our study means all woody perennials.

➢ Data were collected since August till October 2017 in the seven locations using semi-structured questionnaire.

➢ The methodology was based on ICRAF and ISNAR [5] and also was inspired by (Huml 2011) [6].

➢ Farmers were divided into two different agro-ecological zones according to the elevation, lowland (less than 550 m a.s.l.) and highland (more than 550 m a.s.l.).

➢ Altogether 62 farmers were interviewed, 38 form lowland, 11 Qushtapa, 7 Khabat, 9 Shamamik, and 11 Bahirka, and 24 from highland, 11 Korre, 6 Pirmam, and 7 Shaqlawa.

➢ Data evaluation: Frequency (%), use of tree species, Preferences of tree species, Salience index (%) [7], Qualitative of tree species, and field observation.

**Fig. 4.** Farmers' interview

**Study area: Erbil - Capital of Kurdistan (Autonomous Region) of Iraq**
Scale = 1:400,000

Lowlands     Highlands

**Legend**
- Erbil (Capital)
- (62) Farm GPS Locations
- (11) Qushtapa (SD)
- (11) Korre (SD)
- (7) Khabat (D)
- (9) Shamamik (SD)
- (11) Bahirka (SD)
- (6) Pirmam (SD)
- (7) Shaqlawa (SD)
- D=District
- SD=Sub-District

**Fig. 5.** Study site, Erbil city – Kurdistan region of Iraq, adapted from ArcGIS software.

## RESULTS

➢ In total, 46 tree species were found in both regions [Tab. 1].

➢ Fruit trees > commercial profits and livelihoods [Fig. 8].

➢ Olives >most preferred in lowlands; Pomegranates >most preferred in highlands [Tab. 2].

➢ Service role > Windbreak trees > protection of the farms [Fig. 9].

➢ There was no medicinal uses of trees in either regions.

➢ The critical problem was climate change – high temperatures.

**Fig. 6.** Apple fruits for selling     **Fig. 7.** Mature fig fruits
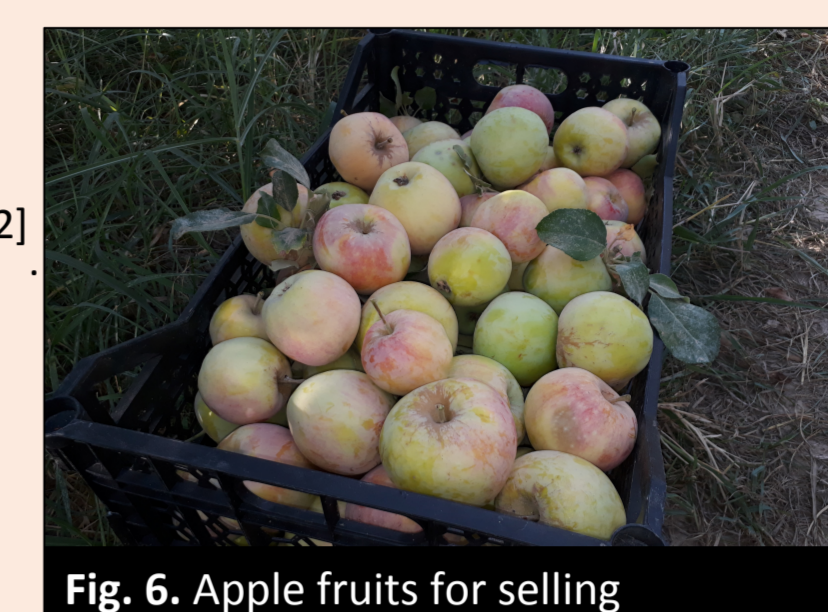
### 1. Species frequency (%) in both regions

**Tab. 1.** Most frequent tree species listed by farmers, their names, origin, life form, main uses and frequency (%) in both regions (lowlands vs. highlands).

| Scientific name | English name | Local name | Origin | Life form | Use | Lowland or Highland | L (38) | H (24) | LH (62) |
|---|---|---|---|---|---|---|---|---|---|
| *Punica granatum* | Pomegranate | Hanar | N | D | Fg, Fr, Ft, Fd, Je, Vr | L, H | **87** | 84 | 85 |
| *Ficus carica* | Fig | Hanjir | N | D | Df, Ft, Jm | L, H | 76 | **88** | 81 |
| *Vitis vinifera* | Grape | Tre | N | D | Df, Fr, Ft, Je, Le | L, H | **84** | 76 | 81 |
| *Eucalyptus camaldulensis* | Eucalyptus | Qalamtuz | I | E | Ag, Sh, Wk, Wd | L, H | **97** | 16 | 65 |
| *Olea europaea* | Olive | Zaetun | I | E | Ft, Ol, Vr | L, H | **89** | 20 | 61 |
| *Prunus armeniaca* | Apricot | Zardalu | N | D | Df, Ft, Jm | L, H | 49 | **80** | 61 |
| *Prunus persica* | Peach | Khokh | N | D | Ft | L, H | 41 | **76** | 55 |
| *Morus alba* | Mulberry | Tu | I | D | Ac, Ft, Sh, Wk | L, H | **57** | 44 | 52 |

**Origin:** N=Native species; I=Introduced species. **Life form:** E=Evergreen species; D=Deciduous species. **Use:** Ac=Aesthetics; Ag=Air cleaning; Df=Dried fruits; Fg=Fencing; Fr=Fodders; Ft=Fruits; Fd=Fuelwoods; Jm=Jams; Je=Juices; Le=Leaves; Ol=Oil; Sh=Shading; Vr=Vinegars; Wk=Windbreaks; Wd=Woods. **Frequency (%):** L=Lowland; H=highland; LH= Lowland & Highland. (38) total lowland farms; (24) total highland farms; (62) total lowland & highland farms.
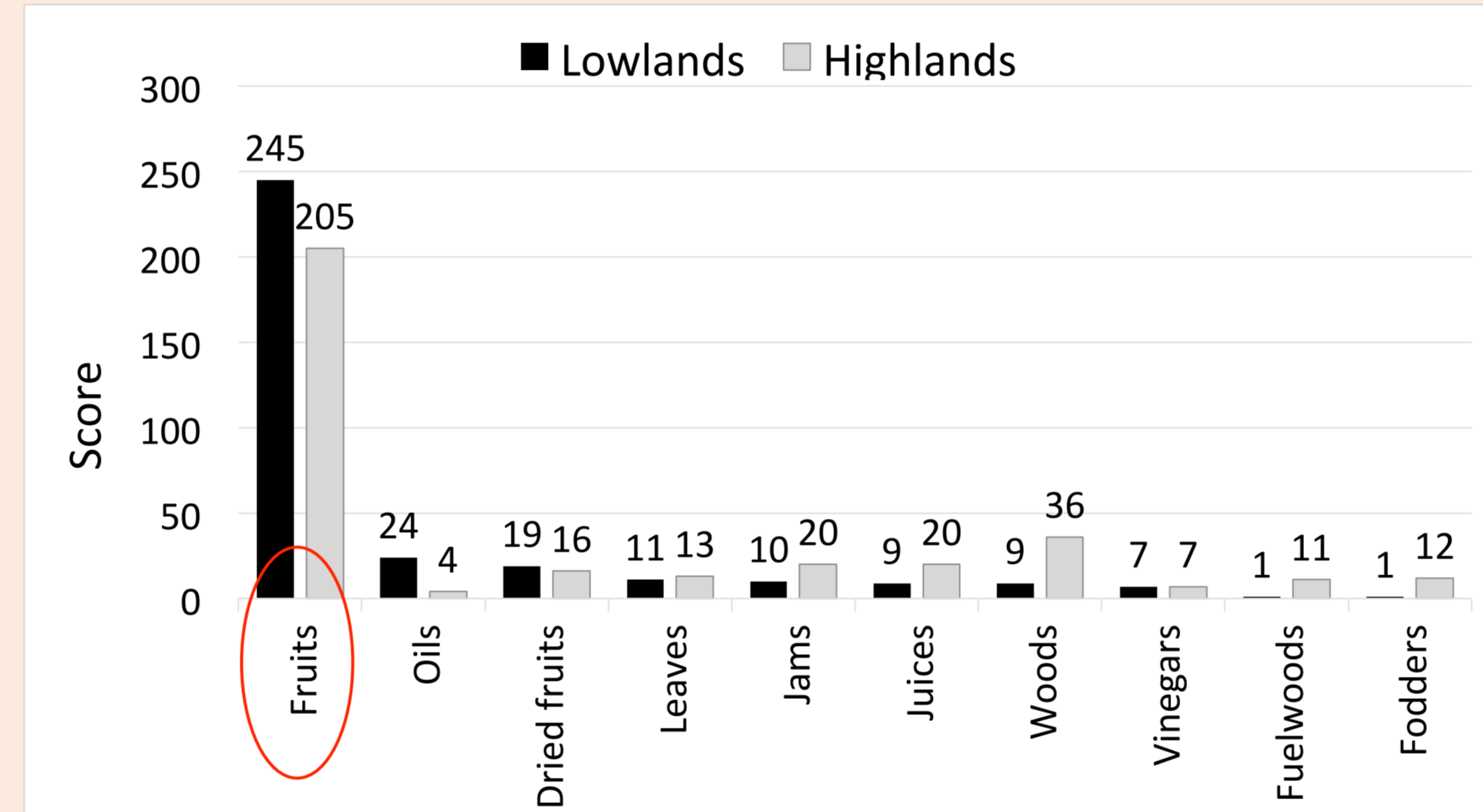
### 2. Use of tree species

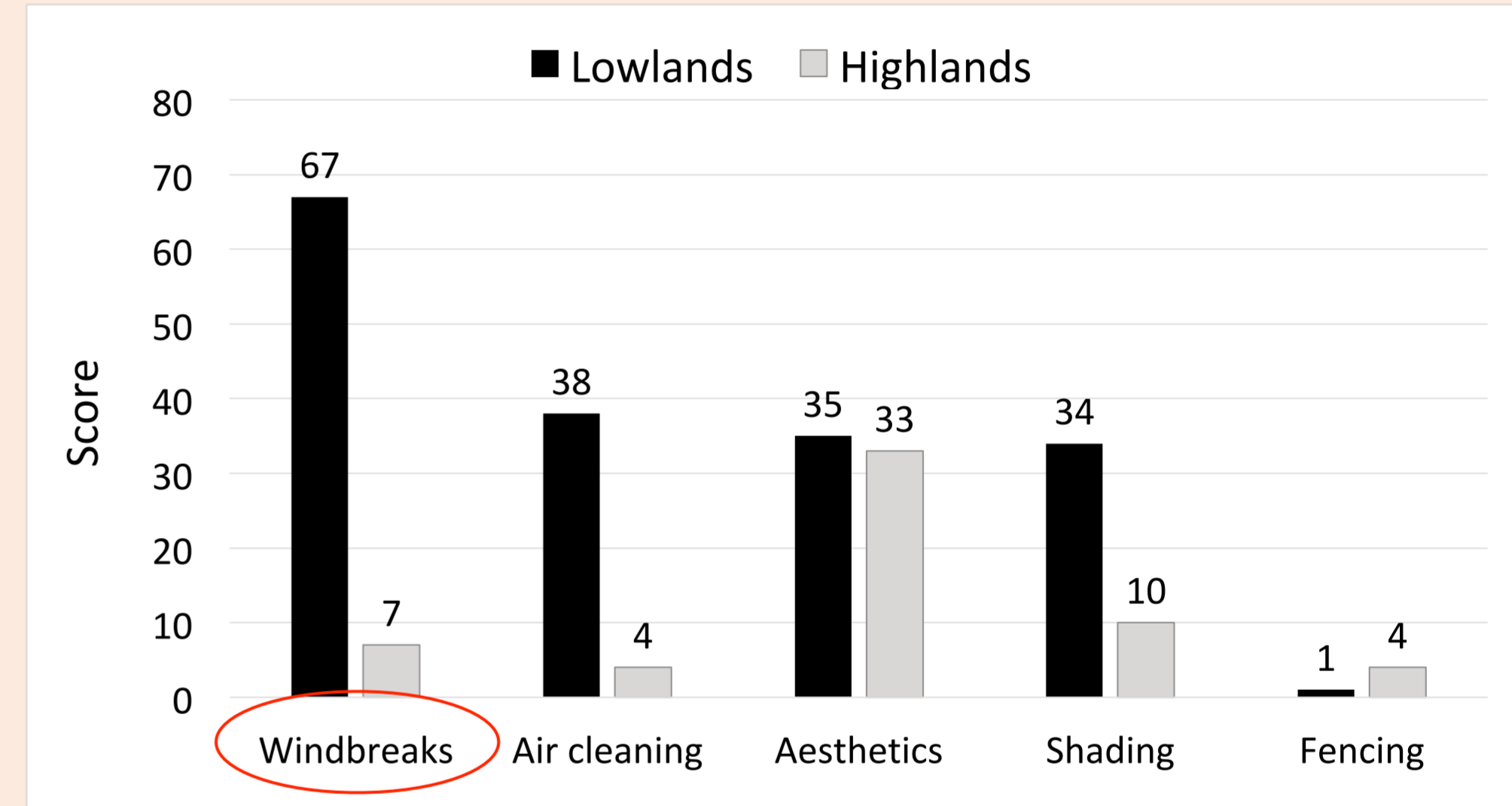**Fig. 8.** The main product use of tree species in lowlands vs. highlands.

**Fig. 9.** The main service role of tree species in lowlands vs. highlands.

### 3. Farmers' preferences of tree species

**Tab. 2.** Farmers' preferences and salience index (%) of tree species in lowlands and highlands.

| English name | Lowlands Qushtapa | Khabat | Shamamik | Bahirka | Total score | Salience index (Ave. %) | English name | Highlands Pirmam | Korre | Shaqlawa | Total score | Salience index (Ave. %) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Olive | 108 | 50 | 37 | 81 | 276 | 94 | Pomegranate | 45 | 101 | 63 | 209 | 95 |
| Pomegranate | 57 | 53 | 63 | 80 | 253 | 82 | Fig | 54 | 68 | 60 | 182 | 71 |
| Grape | 82 | 40 | 47 | 68 | 237 | 69 | Apricot | 29 | 60 | 34 | 123 | 66 |
| Fig | 49 | 37 | 60 | 84 | 230 | 76 | Apple | 13 | 90 | 9 | 112 | 77 |
| Eucalyptus | 51 | 31 | 27 | 26 | 135 | 27 | Peach | 35 | 42 | 32 | 109 | 55 |
| Apricot | 31 | 21 | 38 | 44 | 134 | 73 | Grape | 14 | 58 | 35 | 107 | 70 |
| Mulberry | 26 | 18 | 28 | 27 | 99 | 46 | Pear | 18 | 27 | 31 | 76 | 50 |
| Pear | 40 | 0 | 24 | 30 | 94 | 66 | Walnut | 3 | 30 | 19 | 52 | 55 |
| Peach | 0 | 17 | 45 | 22 | 84 | 66 | Cherry | 0 | 24 | 19 | 43 | 58 |
| Cypress | 17 | 11 | 6 | 5 | 39 | 21 | Olive | 33 | 6 | 0 | 39 | 71 |
| Loquat | 4 | 0 | 12 | 15 | 31 | 55 | Plum | 15 | 10 | 0 | 25 | 38 |
| Almond | 7 | 0 | 0 | 21 | 28 | 54 | Loquat | 16 | 0 | 8 | 24 | 31 |
| Pine | 23 | 5 | 0 | 0 | 28 | 29 | Mulberry | 2 | 15 | 4 | 21 | 58 |
| Orange | 0 | 0 | 11 | 15 | 26 | 58 | Almond | 7 | 0 | 11 | 18 | 46 |
| Chinaberry | 6 | 3 | 11 | 1 | 21 | 29 | Oak | 0 | 0 | 18 | 18 | 46 |

Each number in the table represent the total scores for all the farmers preferred species for each location in the study area. Total preferred species scores for both regions (in descending approach from most important species to least important species). Salience index (average percentage) of most used tree species in both regions (Smith 1993).

## CONCLUSION & RECOMMODATIONS

➢ Agroforestry should be promoted in both regions.

➢ Farmers should focus more on the fruit trees – improved management.

➢ Farmers should manage their trees in better way to avoid the high temperature risks and improve fruit quality and quantity:

i. Reduce the distance between the trees.
ii. Prune the crown of trees into "umbrella shape".
iii. Plant high resistance tree species.
iv. More promotion for the most preferred tree species.

**Fig. 10.** Pomegranate shrub is directly exposed to the high sunlight and high distance between trees (left photo). Undesirable fruit for the market (right photo).

**Fig. 11.** Pomegranate shrub well managed into "umbrella shape" near to the soil with a high capacity of fruits for both quality and quantity.

## REFERENCES

[1] ICRAF. 2018. The World Agroforestry Centre. Agroforestry and our role. Available from http://www.worldagroforestry.org/about/agroforestry-our-role (Accessed on February 2018). [2] Hameed, H. 2013. Water harvesting in Erbil Governorate, Kurdistan region, Iraq: detection of suitable sites using geographic information system and remote sensing. Student thesis series INES . [3] AAI. 2013. Agriculture and farmers in the Kurdish region. Available from https://www.google.cz/search?q=Agriculture+and+farmers+in+Kurdish+region (Accessed on February 2018). [4] IPCC. 2014. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Available from https://www.ipcc.ch/report/ar5/wg2/ (Accessed on April 2018). [5] Franzel, S., H. Jaenicke, and W. Janssen 1996. Choosing the right trees: setting priorities for multipurpose tree improvement. ISNAR The Hague, The Netherlands. [6] Huml, L. 2011. Multipurpose tree species used by small farmers in the Ucayali region, Peruvian Amazon [MSc. Thesis]. Prague: Czech University of Life Sciences Prague. p. 47. [7] Smith 1993. Using ANTHOPAC 3.5 and a spreadsheet to compute a free-list salience index. CAM, 5(3), pp.1-3.

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