

# Information Sheet on Ramsar Wetlands (RIS) – 2006-2008 version

Available for download from [http://www.ramsar.org/ris/key\\_ris\\_index.htm](http://www.ramsar.org/ris/key_ris_index.htm).

*Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8<sup>th</sup> Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX.22 of the 9<sup>th</sup> Conference of the Contracting Parties (2005).*

## Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.
2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2<sup>nd</sup> edition, as amended by COP9 Resolution IX.1 Annex B). A 3<sup>rd</sup> edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.
3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

---

### 1. Name and address of the compiler of this form:

**Name:** PARK, Young-Cheol  
**Position:** National Project Coordinator,  
UNDP/GEF Korea Wetland Project Management Unit,  
**Address:** 307, National Institute of Environmental  
Research, Kyungseo-Dong, Seo-Gu, Incheon, Republic  
of Korea, (Post code: 404-170)  
**Tel.:** +82-32-564-7286  
**Fax.:** +82-32-562-2649  
**E-mail:** [youngyl@me.go.kr](mailto:youngyl@me.go.kr)

### FOR OFFICE USE ONLY.

DD	MM	YY							
Designation date			Site Reference Number						

---

### 2. Date this sheet was completed/updated

May 25, 2007

---

### 3. Country:

Republic of Korea

---

### 4. Name of the Ramsar site

Moojechineup

---

### 5. Designation of new Ramsar site or update of existing site:

**This RIS is for** (tick one box only):

a) Designation of a new Ramsar site Yes  ; or No

b) Updated information on an existing Ramsar site Yes ; or No

---

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area

The Ramsar site boundary and site area are unchanged:

or

If the site boundary has changed:

i) the boundary has been delineated more accurately ; or

ii) the boundary has been extended ; or

iii) the boundary has been restricted\*\*

and/or

If the site area has changed:

i) the area has been measured more accurately ; or

ii) the area has been extended ; or

iii) the area has been reduced\*\*

\*\* **Important note:** If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

---

7. Map of site included

a) A map of the site, with clearly delineated boundaries, is included as:

i) a hard copy (required for inclusion of site in the Ramsar List): ;

ii) an electronic format (e.g. a JPEG or ArcView image) ;

iii) a GIS file providing geo-referenced site boundary vectors and attribute tables .

b) Describe briefly the type of boundary delineation applied:

Fig. 1 shows the boundary of the proposed Ramsar site (Moor 1 + Moor 2)

---

8. Geographical coordinates (latitude/longitude)

E129°08'21.13"~41.72", N35°27'24.43"~46.37"

---

9. General location:

Administrative location: Joil-ri, Samdong-myun, Uljoo-gun, Ulsan Metropolitan City, Republic of Korea

Moojehineup is located in the southeast of the Korean peninsula, and its nearest cities are

Ulsan and Busan.

---

**10. Elevation:**

510 ~ 630 meters At Sea Level (ASL)

---

**11. Area:**

4 ha

---

**12. Overview:**

□ Moojechineup was verified as a ten thousand year-old high moor. It is the oldest one in Korea. Erosion caused by the weather is considered the reason for the existence of the basins. There are well-developed peat layers and slightly acidic surface water.

---

**13. Ramsar Criteria:**

**1** • **2** • **3** • 4 • 5 • 6 • 7 • 8

---

**14. Justification for the application of each Criterion listed in 11. above:**

- **Criterion 1: A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate bio-geographic region.**

Moojechineup has a noticeable peat layer, unlike most of the high moors in Korea, Using the pollen analysis and <sup>14</sup>C dating of the peat layer, it is internationally approved to be ten thousand years old, the oldest high moor in Korea. Since the analysis of the Moojechineup formation and its environmental variation can be used to analyze the geological development processes of the Korean peninsula, Moojechineup is highly evaluated in rareness and academic value, although its size is quite small.

**Criterion 2: A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.**

Various rare flora and fauna including the locally and nationally endangered species have been identified. The table below contains endangered species found in the site.

Table 1. List of rare species found in Moojechineup

Scientific name	Category	Vernacular name	Division
<i>Jeffersonia dubia</i>	Category II	Kengkengyeepul	Plants
<i>Utricularia racemosa</i>	Vulnerable	Tang-gyeeye	
<i>Utricularia bifida</i>	Vulnerable	Isac-gyeeye	
<i>Drosera rotundifolia</i>	Vulnerable	Kunkunye-juguk	
<i>Platanthera mandarinorum</i>	Vulnerable	Sanjebi-lan	
<i>Pogonia japonica</i>	Vulnerable	Kunbangwoolse-lan	
<i>Platanthera hologlottis</i>	Vulnerable	Heenjebi-lan	
<i>Habenaria linearifolia</i>	Vulnerable	Jamjari-lancho	
<i>Leucanthemella linearis</i>	Vulnerable	Kikunsankuk	
<i>Lilium concolor</i>	Vulnerable	Hanulnari	
<i>Erythronium japonicum</i>	Vulnerable	Earlegy	
<i>Prionailurus bengalensi</i>	Category II(CITES Species)	Sac	Mammal

<i>Nannophya pygmaea</i>	Category II	Koma-jamjari	Insecta
<i>Muljarus major</i>	Vulnerable	Kunmuljara	

**Criterion 3 : A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.**

- Moojechineup has a lot of various plant communities.
  - *Molinieta japonicase* class is identified, which is a representative of the intermediate moor (Zwischenmoor) of the mountainous peat moor in the temperate zone of Northeast Asia.
- Moojechineup shows various floras.
  - 70 families, 172 genera, and 281 species (mountain forest types: 146 species, mountain moor types: 65 species, and other types: 79 species)
  - *Platanthera mandarinorum* var. *neglecta* (Korean name: Sanjebi-lan) is considered a variety, made by geographical features of the Korean peninsula.
- Moojechineup shows a very high diversity in insects (14 orders, 88 families, and 197 species). Aquatic insects comprise 8 orders, 23 families, and 52 species, showing an absolutely high diversity. Especially, *Osorius* sp. of Staphylinidae is considered a new species candidate.
- Amphibia ·Reptilia and Mammalia:
  - Amphibia has 2 families and 3 species. A leopard frog (*Rana nigromaculata*) is annually dominant, and a red-bellied frog (*Bombina orientalis*) has a large population in summer. A brown frog (*Rana temporaria ornativentris*) has a low population, but appears annually.
  - Reptilia: lizard (*Scincella laterale laterale*), mamushi (*Aakistrodon blomhoffi brevicaudus*)
  - Mammalia: Korean hare (*Lepus sinensis coreanus*)

---

**15. Biogeography** (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

a) **biogeographic region:** Holarctic Region – Eastern Asiatic Region

Palearctic

b) **biogeographic regionalisation scheme** (include reference citation):

- Lee, Y.C. and Yim, Y.J. (2002) *Plant Geography*, Kangwon National University Press, 412pp.
- Takhtajan, A. (1986) *Floristic Regions of the World*, University of California Press, 522pp.
- Udvardy, M. D. F. (1975). *A classification of the biogeographical provinces of the world*. IUCN Occasional Paper no. 18. Morges, Switzerland: IUCN.

---

**16. Physical features of the site:**

- **Geomorphology:** Moojechineup is located along the mild-sloped valley on the both sides of the 700m high Mt. Jeongjok's north-eastern ridge. So far, over 10 moors have been discovered.

	Area (ha)	Latitude/Longitude
Moor 1	2.3	E129°08'30.35"~39.85", N35°27'34.57"~44.93"
Moor 2	1.7	E129°08'29.46"~36.42", N35°27'24.57"~30.97"

- Geology and Origin: Moojehineup is farthest southeast among the high moors in Korea. The bed rocks are composed of (granite), andesite, and sedimentary rock. The granite is weak due to the weather, so it has been partially eroded, resulting in the basin-shaped landforms. These are believed to be suitable for the genesis of those high moors. There are almost consistent moisture and surface water due to the well-developed tiny channels under the moors.
- Sedimentary Composition of High Moors
  - Moor 1: The depth of 30cm from the surface moor comprises the roots of the current moor vegetation. Brown vegetation debris occupies the depth of 30~50cm. Dark grey peat layer is embedded between 50~70cm. The depth of 70~95cm has a bed rock with scattered sand grains of quartz. A weathered blue-grey zone of granite appears below 95cm.
  - Moor 2: The roots of the current moor vegetation consist of the surface moor. The mid-layer has the mixed sediments of vegetation roots and humus soil. Chopped plants are entangled in the layer. It is dark grey or dark brown in colour, and is saturated with water. The bottom layer has a well-developed peat with fine debris of the plants.
- Physical Properties of Soil
  - Soil hardness: Within the moors, soil hardness is generally constant to the depth of 65cm, and increases after 65cm. The soil hardness increases with the depth of the soil in other areas.
  - Soil infiltration rate: The average infiltration rate of the moors is 5ml/min, and the other areas have 13ml/min on average. Rainfall infiltration is lower in the moors.
  - Soil porosity: The average soil porosity is 56.9%, which is lower than the average value of 67.5% in other areas.
  - Soil water content: The water content is 10 centibars, showing a constant saturation with water. Clayey Moojehineup is always oversaturated with water even during the dry season.
  - Soil pH: 4.5 ~ 4.7
  - Soil electric conductivity: 0.2~0.4  $\mu\text{S}/\text{m}$
- Weather: Applying the temperature lapse rate with altitude ( $0.56^{\circ}\text{C}/100\text{m}$ ) to the data from Ulsan Weather Station of 35m in altitude,
  - mean annual temperature:  $10.9^{\circ}\text{C}$
  - mean coldest temperature (January):  $-1.3^{\circ}\text{C}$
  - mean hottest temperature (August):  $22.8^{\circ}\text{C}$
  - mean annual rainfall: 1300.0 mm
  - mean relative humidity: about 67%
- mean groundwater level: -34.7cm
- In summary, the runoff in the short-term hydrograph increases slowly, so it takes a long time to reach the peak flow. After peak, the runoff decreases much slower than that of the general mountainous watershed. In the case of the long-term water budget, Moojehineup has enough base flow, and the runoff continues even when there is no rainfall.

---

17. Physical features of the catchment area:

□ Watershed Features :

Property of short-term runoff: For the short-term rainfall, the runoff rate of the Moojehineup is 0.14~0.29, which is very low compared with that of other mountainous wetlands. That means that the initial rainfall is rapidly infiltrated into the ground. Low runoff can be explained by the fact that Moojehineup area occupies 38% of the watershed, and its slope is almost flat.

Property of long-term runoff: Compared with the short-term runoff rate, the long-term runoff rate is 0.58, which is similar to that of the general watershed of wetlands. It means that the runoff starts moderately after rainfall, and the infiltrated rainfall drains out continuously.

---

**18. Hydrological values:**

- The groundwater level arrives at peak flow immediately after the rainfall stops, but decreases very gently until the next rainfall. The variation pattern of the long-term groundwater level is very similar to that of the rainfall and discharge. The higher the intensity of the rainfall is, the slower the recession curve slope on the groundwater level is. A longer period of rainfall results in a longer peak flow. That's why Moojehineup has generally a constant groundwater level, resulting in the existence of the Moojehineup.

□

---

**19. Wetland Types**

**a) presence:**

Marine/coastal: A • B • C • D • E • F • G • H • I • J • K • Zk(a)

Inland: L • M • N • O • P • Q • R • Sp • Ss • Tp • Ts • U • Va •  
Vt • W • Xf • Xp • Y • Zg • Zk(b)

Human-made: 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • Zk(c)

**b) dominance:**

---

**20. General ecological features:**

- According to the pollen analyses and the <sup>14</sup>C dating of the sediments of Moor 2, the local pollen assemblage of the montane zone started from the lower upward cool-temperate northern/altimontane forest (MI), changed into the cool-temperate central/montane forest (MIIa), and reached the cool-temperate southern/submontane forest (MIIb). The distribution of the current cool-temperate deciduous broad-leaved forests began to expand from 8,000 yrs B.P., and started to regionally develop from 6,700 yrs B.P. (Choi, 2001).

□ flora

■ Main floras in each moor

➢ Moor 1: *Miscanthus sinensis* var. *Purpurascens* (Korean name:Uksae), *Sanguisorba tenuifolia* var. *alba*(Korean name:Ganunoyeepul), *Convallaria keiskei*(Korean name:Eunbangul-kot), *Pogonia japonica* (Korean name:Kunbangwoolse-lan), etc

➢ Moor 2: *Miscanthus sinensis* var. *purpurascens*(Korean name:Uksae), *Polytrichum formosum*(Korean name:Solicki), etc are dominant.

□ fauna

■ Insecta and Aquatic Insecta: Insecta has 14 orders, 88 families, and 197 species. Among them, aquatic insecta has 8 orders, 23 families, and 52 species.

■ Each taxa in order of biodiversity: Coleoptera order (29 families and 77 species), Lepidoptera order (14 families and 34 species), Hemiptera (13 families 23 species), and Orthoptera (7 families and 15 species)

---

**21. Noteworthy flora:**

- Hydrophyte: 56 species, such as, *Carex dickinsii*, *Carex bimensis*, *Carex maximowiczii*, *Scirpus juncooides*, *Leucanthemella linearis*, etc.
- Insectivorous plants: *Drosera rotundifolia*, *Utricularia bifida*, *Utricularia racemosa*, etc.
- Woody plants: *Quercus serrata*, *Pinus densiflora*, *Quercus dentata*, *Quercus mongolica*, *Alnus japonica*, *Rhus chinensis*, *Castanea crenata*, etc
- Moojechineup has *Molina japonica* Korean name: Jinperisae, which is a representative of the intermediate moor (Zwischenmoor) of the mountainous peat moor in the temperate zone of Northeast Asia.
- *Hypericum laxum*-*Eleocharis acicularis* for. *Longiseta* community, *Drosera rotundifolia*-*Eleocharis congesta* community, *Platanthero-Molinietum japonicae* ass. *Nova hoc loco* community, and *-Alnus japonica* community are representatives.

---

**22. Noteworthy fauna:**

- *Osorius* sp. of Staphylinidae is expected to be a new insect species.
- Aquatic Insecta: *Plateumaris sericea*, *Grylotalpa orientalis*, *Anisodactylus signatus*, etc
- *Agabus browni* and *Agabus japonicus* are dominant in the aquatic environment.
- *Oxya japonica japonica*, *Aphrophora costalis*, and *Harmonia axyridis* are dominant in herbaceous plants.
- *Sympetrum pedemontanum elatum* (Selys) shows the highest population density.

---

**23. Social and Cultural Value**

- The word “Moojechineup” comes from a ritual praying for rain in the Ulsan area. The said ritual is known as “Moowooje”, and the place where the ritual is held is known as “Moojechi”. The local people also call it “Moolti”, which means a place with plenty of water.

---

**24. Land tenure/ownership:**

- (a) within the Ramsar site:
  - Government owned area
- (b) in the surrounding area:
  - Most of them are privately owned area

---

**25. Current land (including water) use:**

- (a) within the Ramsar site:
  - No developing activities are allowed, since Moor 1 and Moor 2 were designated as Ecosystem Conservation Areas? (December 31, 1998), and Wetland Conservation Area (August 9, 1999)
- (b) in the surroundings/catchment:
  - No use

---

**26. Factors (past, present or potential) adversely affecting the site’s ecological character, including changes in land (including water) use and development projects:**

- (a) within the Ramsar site:
  - No developing activities
- (b) in the surrounding area:
  - Construction of a firebreak line: Along the right side of Moor 1 and the left side of Moor 2, a firebreak line was constructed to the top of Mt. Jeongjok (December, 1995)
  - Construction of a wooden bridge and a drainage channel: Constructed along the firebreak line (completed before December 31, 1998)

**27. Conservation measures taken:**

- Moojechineup, including Moor 1 and Moor 2, was found in 1995 and was designated as Ecosystem Conservation Area on December 31, 1998 and as Wetland Conservation Area on August 9, 1999.
  - Daily newspaper (Kukminilbo, July 2, 2001) announced that Moor 3 and Moor 4 could be considered to designate as Wetland Conservation Area.
  - Based on the “Wetland Conservation Plan” for Moojechineup, Nature and Ecology Resource Department, NIER conducted a detail monitoring project from April to December of 2006. Brief information regarding the project is given below.
  - The firebreak line, drainage channel and wooden bridge are considered to expedite the sediment inflow to Moor 1 and Moor 2. To prevent sediment inflow, the Nakdong River Basin Environmental Office selected two sections, which have the highest sediment inflow. The sections of 200m and 190m in length were restored in 2004 (January ~ February) and 2005 (August ~ December), respectively. Another 650m section is restored from June to November, 2006.
- 

**28. Conservation measures proposed but not yet implemented:**

- None
- 

**29. Current scientific research and facilities:**

- Research project
    - Title: Detail monitoring project in Moojechineup
    - Duration: April ~ December, 2006
    - Survey institute: Nature and Ecology Resource Department, NIER
    - Survey items: Geomorphology Landscape, vegetation, flora, insecta, fishes, benthic invertebrate, amphibia, Reptilian, birds, Mammalia, etc.
  - Facilities
    - Automatic rainfall gage: On top of the container just beside Moojechineup
    - An instrument shelter and triangular iron ware for measuring the water level of outflow: installed in the lower zone of Moojechineup
    - WLD14 water gage (Global Water, Inc.): installed in the well to measure the groundwater level
  - It is academically valuable in researching the quaternary environment due to its unique geological and geomorphologic features and the pollen in the peat layers.
- 

**30. Current conservation education:**

- Existing facilities: surveillance center (one), toilet (one), information board (two), fence (one), and wooden bridge
  - Scheduled facilities
    - Office as a visiting and managing center : installing a CCTV system
    - Eco-tour path: a circular pass around Moojechineup with 1.5m width
- 

**31. Current recreation and tourism:**

- Officially, Moojechineup is not used for recreation
- 

**32. Jurisdiction:**

- Ulsan Metropolitan City
- 

**33. Management authority:**

- As enshrined in the Enforcement Ordinance (Article 18) of the Wetland Conservation



Act, 1999, the President of Nakdong River Basin Environmental Office is in charge of the general management of Moojechineup.

□ Person in practical charge:

Director: Mr. Lee, Chang-Yeol<lhjsj105@me.go.kr>

Nature Environment Division

Environment Management Bureau, Nakdong River Basin Environmental Office

(zip code)641-722, 156 Joongang-ro Changwon City (104-3 Shinwol-dong)

☎: +82-55-211-1650,

Corresponding Officer: Ms. Ryu, Yeong-Han<ryh9514@me.go.kr>

☎ : +82-55-211-1651

---

### 34. Bibliographical references:

1. Kim, Jong-Won and Jung-Hoon Kim, 2003. Vegetation of Moojechi Moor in Ulsan: Syntaxonomy and Syndynamics. *Korean Journal of Ecology*, vol. 26(5): 281~287 (in Korean)
2. Kim, Jong-Won, Joong-Hoon Kim, Jae-Chul Jegal, Youk-kyong Lee, Kee-Ryong Choi, Kyung-Hwan Ahn, and Seung-Uk Han, 2005. Vegetation of Mujechi Moor in Ulsan: Actual Vegetation Map and *Alnus japonica* Population. *Korean Journal of Ecology*, vol. 28(2): 99~103 (in Korean)
3. Park, Jae-Keun and Nam-Kee Chang, 1998. Past Vegetation of Moojechi on Mt. Jungjok by Pollen Analysis. *Korean Journal of Ecology*, vol. 21(5-1): 427~433 (in Korean)
4. Bae, Jeong-Jin, Yeon-Sik Choo, and Seung-Dal Song, 2003. The Patterns of Inorganic Cations, Nitrogen and Phosphorus of Plants in Moojechi Moor on Mt. Jeongjok. *Korean Journal of Ecology*, vol. 26(3): 109~114 (in Korean)
5. Myoung Won Son, 2004. Formation Process of the Second Mujechi Moor. *Korean Regional Geographic Society*. Vol. 10, No. 1:206-214
6. Shin, Young Ho, 2002. The relation between erosion-sedimentation environment changes and vegetation changes by analysis of sediments in mountain wetland-In the case of Mujechi wetland at Mt. Jeungjok-, Seoul National University, M.S. thesis, p. 62 (in Korean)
7. D. Y. Lee, K.R. Choi, J.Y. Kim and D. Y. Yang, 1998. Origin and Natural Environment of the Mujechi Highmoor Peat Bog, Cheongjoksan. *The Korean Journal of Quaternary Research*. Vol 12, No.1:63~75 (in Korean)
8. Heon-Ho Lee, and Jae-Hoon Kim, 2002. The Characteristics of the Groundwater Level Change and Rainfall-Runoff in Moojechi Bog. *Kor. J. Env. Eco.* 16(3):239~248 (in Korean)
9. Ulsan Regional Environmental Technology Development Center, 2000. A study on the restoration of Moojechi Moor and the strategy for ecotourism –Hydrological Feature in the Moojechi Moor- coordinated by Kee-Ryong Choi (in Korean)
10. Ho-Sang You, and Woo-Seok Kong, 2001. Landscape Changes of the Mujechi Moor, Mt. Jungjok. *The Korean Journal of Quaternary Research*. Vol. 15, No.2: 101~109 (in Korean)
11. Kee-Ryong Choi, 2001. Palynological Study of Moojechi Bog. *The Korean Journal of Quaternary Research*. Vol. 15, No.1: 13~20 (in Korean)
12. Ministry of Environment, 1997. Survey Report on the Moojechneup in Mt. Jeongjok (First Year), 133pp. (in Korean)
13. Ministry of Environment, 1998. Survey Report on the Moojechneup in Mt. Jeongjok (Second Year), 84pp. (in Korean)
14. Ministry of Environment, 2003. Conservation Plan for Wetland Conservation Areas, 88pp.
15. Lee, Y.C. and Yim, Y.J., 2002. Plant Geography, Kangwon National University Press, Korea. 412pp.

Takhtajan, A., 1986. Floristic Regions of the World, University of California Press. 522pp.

---

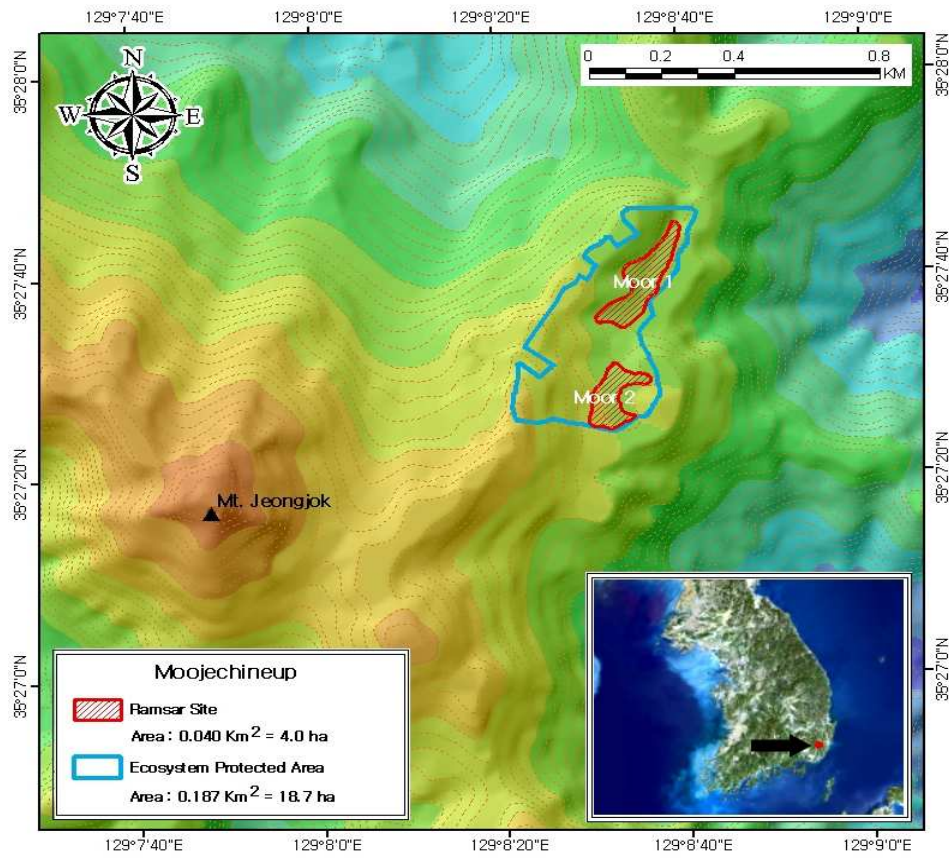


Fig. 1. Moojehineup, a candidate for the Ramsar site, showing 2 moors.



Fig. 2: Landscape of Moor 1



Fig. 3: Landscape of Moor 2