ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR
THE HERIC PROJECT

“Valorising Montenegrin Katuns through Sustainable Development
of Agriculture and Tourism” (KATUN)

3rd IMPROVED draft

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1. INTRODUCTION

The Ministry of Science announced the Second Call for Research and Development Project Grants (CRDS) on May 20th 2014 and it was opened until September 19th 2014. After a two-stage of the external evaluation, the project “Valorising Montenegrin Katuns through Sustainable Development of Agriculture and Tourism” (KATUN), University of Montenegro, Biotechnical Faculty, coordinated by Dr. Milan Marković, is ranked as the highly recommended that will be funded over the next two years.

The project activities fall into screening category II (B) according to the World Bank rules and require development of the Environmental Management Plan (EMP).

Project description

CONSORTIUM
This proposal encompasses:
A) The researchers from Montenegrin institutions:
   • Biotechnical Faculty, University of Montenegro (BTF),
   • Historical institute of Montenegro, University of Montenegro (HIM)
   • Faculty for Tourism and Hotel Management Kotor, University of Montenegro (FTHM)
B) International scientific research institutions:
   • Biotechnical Faculty, University of Ljubljana, Slovenia (UL)
   • Swedish Univ. of Agricultural Sciences, Dept. of Forest Mycology and Plant Pathology (SLU)
   • Istituto per la technologie applicate ai beni culturali, Italy (ITABC)
   • University of Basilicata, Italy (UoB)
C) Two business partners from Montenegro:
   • HM Durmitor D.o.o. Žabljak, NM1 (HMD)
   • The Old House D.o.o, Podgorica NS2 (TOH)

In total 7 scientific or high education institutions and two business partners are involved in KATUN project.

Summary (Background of the project)

The main goal of the KATUN project is to provide knowledge bases for sustainability of the mountain agriculture and to enhance its competitiveness, to preserve important part of the cultural heritage of rural areas and boost the agro-tourism at the katuns, as the nuclei for further social-economic development on Montenegrin mountains. KATUN project is focused on transfer of knowledge and innovations to the agriculture and agro-tourism,

1 NM-National Medium-Sized Enterprise
2 NS-National Small-Sized Enterprise
generate entrepreneurship in the mountainous agriculture, achieve a new level of sustainable cultural heritage protection and its incorporation in modern agricultural and tourism tendencies and demonstrate interdisciplinary and multidisciplinary research approach by development intensive partnership.

The KATUN project is structured in a way that involves researches are highly complemented, providing integral development of the mountain regions in Montenegro. It proposes a unique – integrative solution for the Montenegrin mountain resources (to use all opportunities at the katuns and affirming each of the three aspects of sustainability). Thus, an innovativeness of the project lays primarily in its holistic approach (multidisciplinary and comprehensive treatment of all the aspects of the katuns in line with rural society expectations to breathe new life into the katuns by high integration of the sustainable development of agriculture and agro-tourism) and in the outcomes (specific forms of knowledge transfer, new dairy products, new types of tourism offer and for the first time valuable data on cultural-historical heritage).

LOCATION OF THE PROJECT ACTIVITIES IN MONTENEGRO

All project activities will be done at the Biotechnical Faculty (Dairy Laboratory, Laboratory for Molecular Genetic in Livestock and Laboratory for Forestry Research) also as at companies HM Durmitor and The Old House.

The field activities and researches will be realized at:

- **the “Mountains of Kuči”** - an area in the eastern part of Montenegro, containing the parts of Komovi and Prokletije as well as whole Žijevo mountain’s massif.
  Geographically, it covers c.ca 220 square kilometres, and
- **the Durmitor area, which** belongs to south-Dinaric area and is located in the northern part of Montenegro. This area belongs to three municipalities: Žabljak, Šavnik and Plužine. The massif of Durmitor is bordered by the Tara river canyon on the north, the Piva river canyon on the west, and by the Komarnica and Grabovica rivers canyon on the south.

There are no exact data on the number of households, with number of animals which regularly move to the katuns in these two areas. However, our rough estimation says that the number of households that use katuns at the Mountains of Kuči is about 150 with approximately 2,000 livestock units (one livestock unit is equivalent to one adult cattle or 10 sheep or 10 goats), while at the Durmitor area the number of households is about 200 with 2,500 livestock units.

*The project activities will be focused on:*

- Analyzing of current status of all aspects of the production activities at katuns, specificities on rearing of different ruminants, with identification of all weaknesses and opportunities; Partner institutions for implementation of activity: BTF, HIM; FTHM; UL,
- Knowledge transfer through different type of educations of producers (farmers and companies) with aim to improve production practices and technologies on the farms and to increase current production capacities; Partner institutions for implementation of activity: BTF, UL; HMD; TOH
- Investigation of quality parameters (chemical and hygiene quality) of traditional dairy products (Kučki cheese) and (Durmitor skorup, and law-fat cheese Prljo) for the purpose of protection their designation of origin (PDO); Partner institutions for implementation of activity: BTF, UL, HMD, TOH
- Creation of new dairy products (different types of cheese), Partner institutions for implementation of activity: BTF, UL, HMD, TOH
- Education and support producers (companies and farmers) to establish producers associations, as well as for diversification of economic activities at katuns (agro-tourism, collection of non-wood forest products etc); Partner institutions for implementation of activity: BTF, FTHM; HIM; UL; UoB, HMD, TOH.
- Research of forests and biodiversity. Valorization of the main non-wood forest products - primarily wild edible mushroom, berries, medical and aromatic herbs including arising of rural society awareness and knowledge about them. The partner institutions for implementation of the activity are: BTF, SLU.
- Inventory of the all live and abandoned katuns on the Mountains of Kuči, their classification, characterization and cadastre; analysis of their origin, function and historical-social background, as well as the estimation of their cultural-historical value; Partner institutions for implementation of activity: HIM, ITABC.
- Development of different tourism activities at the katuns; active holiday through participation tourist in all the farm activities (keeping livestock on pastures, milking, milk processing, field work - collecting hay, collection of non-wood forest products); active sports – hiking, general mountaineering, sport and alpine climbing, mountain biking and caving. Partner institutions for implementation the activity are: FTHM, HIM, UoB.
### 2. ACTIVITIES IN KATUN PROJECT BY WORK PACKAGES (WP-s) AND THEIR POSSIBLE NEGATIVE IMPACTS ON THE ENVIRONMENT

<table>
<thead>
<tr>
<th>Activities in KATUN project by WP-s</th>
<th>Possible impact during project implementation</th>
<th>Possible impact beyond project implementation</th>
<th>Institutions for implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>WP1. Fostering the traditional production technologies and marketing of the katuns</td>
<td></td>
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</tr>
<tr>
<td>1.1.1 Survey on the main resources: Inventory and investigation of agricultural resources and activities at katuns</td>
<td>NO</td>
<td>Yes</td>
<td>BTF, FTHM, UL</td>
</tr>
<tr>
<td>1.1.2 Characterisation of autochthonous livestock breeds</td>
<td>Yes (Lab. safety)</td>
<td>No</td>
<td>BTF</td>
</tr>
<tr>
<td>1.1.3 On farm demonstrations and trainings for Empowerment of the High nature value (HNV)</td>
<td>NO</td>
<td>NO</td>
<td>BTF, UL, HMD, TOH</td>
</tr>
<tr>
<td>1.1.4 Analysis of chemical and quality control of row milk, dairy products and cheese.</td>
<td>Yes (Lab. safety)</td>
<td>NO</td>
<td>BTF, UL</td>
</tr>
<tr>
<td>1.1.5 Education for improvement of technology, chemical and hygienic quality of traditional dairy products</td>
<td>NO</td>
<td>NO</td>
<td>BTF, HMD, TOH</td>
</tr>
<tr>
<td>1.1.6 Creation of the new dairy products</td>
<td>Yes (waste water)</td>
<td>Yes</td>
<td>BTF, UL, HMD, TOH</td>
</tr>
<tr>
<td>1.1.6 Education and field demonstration for production of other agricultural products</td>
<td>NO</td>
<td>NO</td>
<td>BTF, HMD, TOH</td>
</tr>
<tr>
<td>1.1.7 Mapping of forests, field survey and inventory of wild edible mushrooms, forest fruits and most common medical and</td>
<td>NO</td>
<td>NO</td>
<td>BTF</td>
</tr>
<tr>
<td>1.1.7 Field survey and inventory of <em>Pinus heldreichii</em> symbiotic fungi and pathogens.</td>
<td>Yes (biodiversit)</td>
<td>NO</td>
<td>BTF,</td>
</tr>
<tr>
<td>1.1.7 Morphological and genetic characterization of symbiotic fungi and pathogens</td>
<td>YES (Lab. safety)</td>
<td>NO</td>
<td>BTF,</td>
</tr>
<tr>
<td>1.1.7 Creation of electronic database with GIS positioning of forests, plants and fungi</td>
<td>NO</td>
<td>NO</td>
<td>BTF</td>
</tr>
<tr>
<td>1.1.7 Identification of most valuable NWFP in study areas, education and training</td>
<td>NO</td>
<td>NO/YES</td>
<td>BTF</td>
</tr>
<tr>
<td>1.1.8 Marketing and promotion of the products</td>
<td>NO</td>
<td>NO</td>
<td>FTHM, BTF, UL, HMD, TOH</td>
</tr>
<tr>
<td>WP 2. Social dimension of the katuns – reinforcing their regional image</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Local community capacity building and networking</td>
<td>NO</td>
<td>NO</td>
<td>BTF, FTHM, UL</td>
</tr>
<tr>
<td>2.2 Promotion of good practices and economical sustainability</td>
<td>NO</td>
<td>NO</td>
<td>FTHM, UoB</td>
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<tr>
<td>WP 3. Diversification of economic activities at the katuns:</td>
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<td>------------------------------------------------------------</td>
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<tr>
<td>3.1. Identification of main tourist attractions and definition of the main tourist routes</td>
<td>NO</td>
<td>YES</td>
<td>FTHM, HIM</td>
</tr>
<tr>
<td>3.2. Development of the themes for future tourism product/experiences</td>
<td>NO</td>
<td>YES</td>
<td>FTHM; HIM; HMD; TOH</td>
</tr>
<tr>
<td>3.3. Identification of potentials for agro-tourism products/experience development and diversification</td>
<td>NO</td>
<td>YES</td>
<td>FTHM, HIM</td>
</tr>
<tr>
<td>3.4. Management and organization of a destination</td>
<td>NO</td>
<td>NO</td>
<td>FTHM, HMD, TOH</td>
</tr>
<tr>
<td>3.5. Development and implementation of the communication and branding strategy</td>
<td>NO</td>
<td>NO</td>
<td>BTF, FTHM; HIM, HMD, TOH</td>
</tr>
<tr>
<td>3.6. Capacity building of local community</td>
<td>NO</td>
<td>NO</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WP 4. Strengthening of the research capacities (the human resources and research infrastructure)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1. Lifelong learning program- education</td>
</tr>
<tr>
<td>4.2. Engagement of young researchers</td>
</tr>
<tr>
<td>4.3. Mobility trainings of the project team members in the partner institutions</td>
</tr>
<tr>
<td>4.4. Purchasing equipment for realization of the project</td>
</tr>
<tr>
<td>4.5. Organization of conference</td>
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<tr>
<td>4.6. Building for interdisciplinary and multidisciplinary projects - teaming for</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WP 5. Maximize the sustainable impact and visibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1. Design of website</td>
</tr>
<tr>
<td>5.2. Dissemination means and materials for promoting the project results to the general public</td>
</tr>
<tr>
<td>5.3. Publications in international and the national scientific journals</td>
</tr>
</tbody>
</table>
### WP6. Management

<table>
<thead>
<tr>
<th>6.1.</th>
<th>Coordination and Technical management</th>
<th>NO</th>
<th>NO</th>
<th>BTF</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2.</td>
<td>Financial and administrative management</td>
<td>NO</td>
<td>NO</td>
<td>BTF</td>
</tr>
<tr>
<td>6.3.</td>
<td>Communication with HERIC and the Ministry</td>
<td>NO</td>
<td>NO</td>
<td>BTF</td>
</tr>
<tr>
<td>6.4.</td>
<td>Reporting</td>
<td>NO</td>
<td>NO</td>
<td>BTF</td>
</tr>
<tr>
<td>6.5.</td>
<td>Procurement management</td>
<td>NO</td>
<td>NO</td>
<td>BTF</td>
</tr>
</tbody>
</table>

**Anticipated Project Outcomes and Impacts**

<table>
<thead>
<tr>
<th></th>
<th>Overgrazing and excess manure caused by an increase of livestock in an area</th>
<th>NO</th>
<th>YES</th>
<th>New users of the katuns</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Increased wastewater generated from milk and cheese processing</td>
<td>NO</td>
<td>YES</td>
<td>TOH and other new producers</td>
</tr>
<tr>
<td>3</td>
<td>Possible pressures on environment from an increase in tourist activity in area (impact on soil, water, wildlife and increased waste management)</td>
<td>NO</td>
<td>YES</td>
<td>Touristic organizations, local governments, local communities</td>
</tr>
<tr>
<td>4</td>
<td>Risk of using modern materials to improve and speed up construction and reconstruction of katuns therefore destroying their overall cultural heritage concept</td>
<td>NO</td>
<td>YES</td>
<td>New users of the katuns in cooperation with local governments and communities</td>
</tr>
</tbody>
</table>

#### 3. DESCRIPTION OF ACTIVITIES WITH POSSIBLE AND WITH IDENTIFIED ENVIRONMENTAL IMPACT

**3.1 Possible impacts during project implementation**

Activities with possible and with identified environmental impact from WP1 during project implementation will be implemented in the following BTF laboratories: Dairy Laboratory, Laboratory for Molecular Genetic in Livestock, Laboratory for Forestry Research, then in Specialised Veterinary laboratory (Džordža Vašingtona bb, Podgorica) and the planned activities at both commercial partners HMD and TOH.

**Activities in Dairy Laboratory, BTF**

During the project realization we will investigate quality and hygienic parameters of raw milk and traditional dairy products, do analysis of chemical and hygienic quality of raw milk and chosen dairy products, analyze of chemical quality (fat, proteins, dry matter and salt) and hygienic quality of cheese according to national rulebook (presence of *Salmonella sp*, *Lysteria monocytogen* and *Staphylococcus sp*.), also as analysis of chemical and...
hygienic quality of new goat dairy products for “The Old House” company. These activities
do belong to the activities for which full environmental assessment (EIA) is not required, in
accordance with Low on Environmental Impact Assessment.

**Analysis of the chemical quality of raw milk** is carried out on the MilkoScan 4000, which
uses the method IDF 141C: 2000 “Determination of milkfat, protein and lactose content -
guidance on the operation of mid-infrared instruments”. MilkoScan 4000 is stocked by
compact infrared system. The instrument automatically pipetted sample entering the flow
system of the instrument. Flow system has several functions: transporting a representative
sample from the vial to cuvette with a minimum transmission errors between samples,
homogenize the sample before entering the cuvette, reduces the effect of different size
globules of fat and provides constant pressure in the cuvette during transfer IR energy
through the thin film sample in the cuvette. After homogenization of the milk sample,
infrared spectrophotometer measure the radiation absorbed and on the basis of that,
provide data on the chemical quality of the milk.

**Analysis of somatic cells in raw milk** is carried out on Fossomatic 5000 which uses the
cytometry is based on passing a very thin stream of the sample in front of the detector.
Stream of sample is carried to the detector by liquid fluid, which is very thin but well-
defined. Diameter stream is so tiny that somatic cells are passing by the detectors one at a
time. Before passing through the flow system of somatic cells are colored by fluorescent
dye (where the color of the DNA molecule). When stained cells go through numerous unit
and exposed to blue light the cells re-emit red light. This red light is emitted as a pulse that
sends cells. Multiplying counted pulses with working factor is obtained somatic cells / ml.

**The total number of bacteria in raw milk** shall be determined on the instrument BactoScan
FC 100H which uses the method IDF 161A: 1995 " Milk- Quantitative determination of
bacteriological quality-Guidance on Evaluation of routine methods ". This is also the method
of flow cytometry and principle of operation is identical to the previous method.

**Analysis of the chemical quality of milk products** is carried out on the MilkoScan FT 120,
which uses the modified method IDF 141C: 2000 " Determination of milkfat, protein and
lactose content - guidance on the operation of mid-infrared instruments ". The modification
consists in increasing the number of filters used for spectrophotometric reading, so that the
method is called FTIR Spectrophotometry.

Fourier transform infrared spectroscopy (FTIR) is a technique which is used to obtain an
infrared spectrum of absorption, emission, photoconductivity or Raman scattering of a
solid, liquid or gas. An FTIR spectrometer simultaneously collects high spectral resolution
data over a wide spectral range. This confers a significant advantage over a
dispersive spectrometer which measures intensity over a narrow range of wavelengths at a
time. These activities will be implemented at Dairy laboratory (BTF)

Analysis of hygienic quality of milk products shall be carried out by standard
microbiological methods for detecting of *Salmonella spp*, *Listeria monocytogenes* and
*Staphylococcus sp*. presence. Analysis of hygienic quality of milk products **shall be carried
out at Specialized Veterinary Laboratory**, Džordža Vašingtona bb, Podgorica, since Dairy
Laboratory doesn’t have implemented microbiological methods for milk products.
Activities in Laboratory for molecular genetic in livestock, BTF

Activities on genetic characterisation of autochthonous sheep breeds (Ljaba, Bardoka and Pivska pramenka) will be done in the Laboratory for molecular genetic in livestock at BTF. It will be done DNA extraction from blood and characterisation of polymorphism of some milk proteins (beta lactoglobulin and Alfa S1 casein). Microsatellite or SNP analyses will be done in some external lab (service of out border lab).

Blood samples will be collected from sheep breeds and flocks reared in the project area (Durmitor and Kuci mountain). Blood sampling in the sterile vacuum tubes will be done by the veterinary expert responsible for appropriate area. Small quantity of animal blood (3 ml) will be transferred to Laboratory for molecular genetic in livestock for further DNA analysis.

Extraction of genomic DNA will be done by use of blood DNA extraction kit (different manufacturers).

The Blood DNA Extraction Kit is designed for rapid and efficient purification of genomic DNA. This kit applies the principle of a mini-column spin technology and the use of optimized buffers to ensure that only DNA is isolated while cellular proteins, metabolites, salts and other low molecular weight impurities are removed during the subsequent washing steps. High-purity genomic DNA is then eluted in water or low salt buffers. No toxic or organic-based extraction required (manufacturers Handbook). Protocol for DNA extraction is the standard procedure which is used as a routine for this purpose.

Universal or specific primers will be used for amplification of DNA fragments of beta Lgb or alfa S1 casein by conventional PCR. PCR amplification does not produce any waste, and hence do not have environmental impact.

Characterisation of polymorphic structure of beta lactoglobuline (beta Lgb) or alfa S1 casein will be carried out by RFLP analyses, by restriction enzymes Rsal and MboII.

PCR products will be visualized on 1% agarose gel. For that purpose environmental safe nontoxic stains will be used-siber green/midori green.

These activities do belong to the group for which a full Environmental Impact Assessment (EIA) is not required, in accordance with the Law on Environmental Impact Assessment.

Activities in Laboratory for Forestry research, BTF

During the project genetic characterisation of Pinus heldreichii symbiotic fungi and pathogens will be done. Pinus heldreichii is protected according to Low of Nature protection of Montenegro (Act on Protection of Certain Plant and Animal Species, Official Gazette of MNE 76/06; Rješenje o stavljanju pod zaštitu pojedinih biljnih i životinjskih vrsta, Sl. list RCG 76/06/). According to Low of Nature Protection of Montenegro (Official Gazette of MNE 51/08, 21/09, 40/11, 62/13, 06/14) (Article 84), The permit for collection of P. heldreichii plant material is needed. A permit from Environmental protection agency of
Montenegro is obtained. The permit is valid from April 2015 to December 31 2015 (Annex 1). This permission is necessary for field work. Further activities with collected material will be carried in Laboratory for Forestry research at BTF. It is planned that sampling of *P. heldreichii* plant material will be finished during the first year of project (2015), while the laboratory work and analysis of sampled material will be done during the second project year.

Needles and branches (not more than 15-20 cm long) with symptoms of needle diseases (necrosis, spots, red rings, necrotic tips of needles, etc) will be collected and transported to Laboratory for forestry research. The presence of needle diseases will be determined according to characteristic symptoms and/or the occurrence of fruit body, which will be determined based on microscopic analyses. Further, pine needles will be used for isolation of pathogens on nutrient media, and will be frozen on -20 °C for molecular analysis.

DNA extractions from plant or fungal material will be carried using DNA extraction protocol and commercial kits for DNA extraction (different manufacturers). Universal or species specific primers will be used for amplification by conventional PCR. PCR products will be visualized on 1% agarose gel. (For that purpose environmental safe nontoxic stains will be used-siber green). The PCR products will be purified and sequencing in commercial laboratories (Macrogen Inc., Seoul, Korea).

These activities do belong to the group for which a full Environmental Impact Assessment (EIA) is not required, in accordance with the Law on Environmental Impact Assessment.

**Activities in Specialized Veterinary Laboratory** (Džordža Vašingtona bb, Podgorica)

During the project realization we will investigate quality and hygienic parameters of raw milk and traditional dairy products. Researches related to quality will be done in Dairy laboratory on BTF, while hygienic parameters of row milk and traditional dairy products will be analyzed in Specialized Veterinary laboratory (Džordža Vašingtona bb, Podgorica)

Specialized Veterinary laboratory is certified according to MEST ISO /IEC 17025:2006 standard, and is being competent for performing microbiological testing of food of animal origin: meat and meat products, milk and dairy products, eggs and eggs products, etc.

During the realization of project, in Specialized Veterinary laboratory presence of *Salmonella sp, Lysteria monoclygena* and *Staphylococcus sp. will be analyzed in row milk and dairy products. The following microbiological testing will be carried:

- Horizontal method for the detection Salomonella spp., according to following test methode: MEST EN ISO 6579:2008


These activities do belong to the activities for which full environmental assessment (EIA) is not required, in accordance with Low on Environmental Impact Assessment.

Activities in HMD

During the project, new dairy products (type of semi hard cheese) will be created at HMD. Technological process consists of the following steps:

**Milk preparation** (fresh raw milk is filtrated and heated to a temperature of 32-35 °C); **Coagulation** (rennet is added in raw milk in amount sufficient to coagulate milk during period of 30-60 minutes - preferably 45 minutes); **curd processing** (when the milk coagulate and curd is separated from the wall of the vessel in which the milk is, curd processing starts; first curd is cut at small cubes of walnut size, than left to rest for 5 minutes, and then cut to size of grain, and finally chopped curd is left to ’idle’ another 10-15 minutes in warm whey); **curd forming** (curd is formed by hands in whey and whay is gently heated to a temperature of 40-45 °C; It is necessary that all the cheese grains blind in the curd which is of spherical shape, This process should take 10-20 minutes); **Curd “squeezing”** (when it is formed, curd is placed in cheese cloth and further squeezes and shaped by hands, and **whay is separated for the further use**, squeezing continues putting the curd into a mold, curd in the mold is slightly weighted; After 90 minutes curd is turning to the other side and stronger weighted; curds standing in the mold the next 24 hours and at the same time still 3-4 times turned); **Salting** (The cheese is removed from the mold, washed with cold water, dried and salted; salting is done with dry salt, lightly rubbed at top, bottom and sides of cheese Salting is performed 2-3 times in the next 24-48 hours and in this period it is necessary to turn the cheese 3-4 times a day, always on a dry surface); **Cheese ripening** - Cheese ripens on the shelves. The first 10-15 days the cheese is turning 3-4 times a day and always on the dry part of the shelf, later, at least once a day. If during the ripening of the cheese mold growth, cheese should be washed by cold and salt water and dried before putting it on the shelf. Ripening is 28 days (4 weeks). The optimum temperature in the ripening room is 15-18 °C, but the most important thing that there is little temperature fluctuation. It is necessary to maintain the humidity in the ripening room (80-90%). It is very important that: after each production cycle, all equipment used in cheese production **must be well washed and dried**.

Activities in TOH

During the project realization TOH will establish dairy, on its own costs. Besides, TOH will establish new sheep farm and production of lamb and meat.

It is planned that our project activity will be connected with goat milk production and creation of new – goat dairy product (semi hard cheese) as TOH is planned. Technological process for semi hard cheese consists of the following steps:

**Milk preparation** (fresh raw milk is filtrated and heated to a temperature of 32-35 °C);
Coagulation (rennet is added in raw milk in amount sufficient to coagulate milk during period of 30-60 minutes - preferably 45 minutes); **curd processing** (when the milk coagulate and curd is separated from the wall of the vessel in which the milk is, curd processing starts; first curd is cut at small cubes of walnut size, than left to rest for 5 minutes, and then cut to size of grain, and finally chopped curd is left to 'idle' another 10-15 minutes in warm whey); **curd forming** (curd is formed by hands in whey and whay is gently heated to a temperature of 40-45 °C; It is necessary that all the cheese grains blind in the curd which is of spherical shape, This process should take 10-20 minutes); **Curd “squeezing”** (when it is formed, curd is placed in cheese cloth and further squeezes and shaped by hands, and **whay is separated for the further use**, squeezing continues putting the curd into a mold, curd in the mold is slightly weighted; After 90 minutes curd is turning to the other side and stronger weighted; curds standing in the mold the next 24 hours and at the same time still 3-4 times turned); **Salting** (The cheese is removed from the mold, washed with cold water, dried and salted; salting is done with dry salt, lightly rubbed at top, bottom and sides of cheese Salting is performed 2-3 times in the next 24-48 hours and in this period it is necessary to turn the cheese 3-4 times a day, always on a dry surface); **Cheese ripening** - Cheese ripens on the shelves. The first 10-15 days the cheese is turning 3-4 times a day and always on the dry part of the shelf, later, at least once a day. If during the ripening of the cheese mold growth, cheese should be washed by cold and salt water and dried before putting it on the shelf. Ripening is 28 days (4 weeks). The optimum temperature in the ripening room is 15-18 °C, but the most important thing that there is little temperature fluctuation. It is necessary to maintain the humidity in the ripening room (80-90%)

It is very important that: after each production cycle, all equipment used in cheese production **must be well washed and dried**.

The **goat farm** as well as the linked **cheese processing plant** will need to ensure all required permits as mandated by the Montenegrin laws on water protection and environment. As such, wastewater treatment needs to satisfy the threshold values as set forth in the Montenegrin laws, while adequate provisions for waste and manure management need to be in place for both the farm and the plant. **In Annex 2** (**Environmental Management Plan for milk collection and processing systems**), mitigation measures and way of their monitoring for milk collection and procesing system are listed. All issues related to construction and following operation during the establishment of diary will be taken into consideration.
3.2. Possible impacts regarding anticipated project results

**Increased production of wastewater from production of new dairy products (cheese)**

Wastewater management is very important in cheese production. The majority of waste water in cheese production are water used for washing of equipment and facilities. Washing is done after every production process. Washing is done usually by hot and cold water and detergents. The dairy industry is using special group of detergents that are easily washed from the equipment and that are degradable. According to the Rulebook (Official Gazette of Montenegro, No. 59/2013), waste resulting from the processing of milk is not labeled as dangerous. The same Rulebook provides for the removal of such wastes in three ways: Surface removal, ie. disposing of liquid or sedimentary waste into pits, ponds or lagoons, etc. (code D4); Biological treatment (code D8) and Physical-chemical treatment (code D9). Rulebook (Official Gazette of Montenegro, No. 52/2012) provides that in areas where it is not built public sewer, can be carried out construction of septic tanks.

HM Durmitor has already solved the problem of wastewater. The Veterinary Directorate (VD) gave the Decision of approving the activity for raw milk collecting and processing. On the basis of the documentation and visit and examination of facilities, it was found that HM Durmitor meets the requirements in terms of the location, equipment for the collection and processing of raw milk, ventilation, lighting, the water supply, wastewater disposal, packaging, transport and disposal of solid waste. TOH also has septic tank that is used for waterwaste disposal, but they don't have official Decision from VD. One of the Project activities will be providing optimum conditions for waterwaste disposal and obtaining the Decision from VD.

**Increased grazing and manure within areas where katuns are being rehabilitated.**

Taking into consideration number of the animals which use the summer pasture in both project areas (4,500 on both localities/ given on page 3 of this EMP) and the resources available for pasture, use of the pasture resources nowadays is at very low level. It was elaborated in the Project application (page 7) that number of sheep was reduced almost three times in last 50 years, from 600,000 in the sixties of 20th century to 227,000 in 2010. Thus, even significant increase in number of the grazing animals would not affect the resources or cause problems with overgrazing.

**Increased visitor and tourist activity into given area**

Agro-tourism, as form of small-scale tourism, is considered as factor of preservation and natural appreciation more than factor of development. Moreover, agro-tourism is seen as instrument of rural revitalization, with primary function to be source of additional income, with agriculture (and other traditional activities) as main sources of employment and income. Due to mentioned thesis, agro-tourism in katun will be promoted via this
project as important tool for revitalization of rural life and production of cheese (e.g., agro-tourism as new marketing channel, where sale will be on katun/farm). Also, following issues linked with agro-tourism in katuns and katun itself are important:

- The (re)construction of katuns uses all natural materials, working to minimize the net environmental impact.
- Remoteness of katuns is also important factor in their preservation, what could be seen as opportunity to select and attract tourist with special interest, more responsible that generate greater income.
- Katuns are a pre-existing structures, so there is minimal impact on the natural surroundings. Their use in tourism purposes fit into the physical and cultural environments through attention to design and building materials.
- Katuns do not use energy that causes pollution. If necessary, they will utilize “green” technologies that provide sustainable means of water acquisition and safe disposal of solid waste and sewage.
- Agro-tourism in katuns involve local communities in development stages and seek to bring about economic and educational benefits to communities;
- Agro-tourism in katuns will integrate environmental and cultural education into the visitor's experience.
- As mentioned before, agro-tourism refers to a small-scale tourism development through which the implementation minimizes impacts to the environment and maximizes benefits to local communities and conservation.
- Due to sustainable character of agro-tourism, especially in sense of absence of agresiveness compared to mass-tourism in coastal zone, the impact on the environment is minimal. Moreover, there could be predicted that overall impact will be positive, especially in context of landscape revitalization, more sustainable agriculture and responsible use of resources.

Potential to use modern materials and destroy the overall concept of katuns

Katuns /summer pasture settlements/, which form a specific segment of the traditional architecture, created out of the rural areas, in mountain zones not easily accessible, are characterized by the use of only local materials and traditional construction techniques. Possible contemporary interventions with modern materials, both in the restoration of the existing and the construction of new katuns, can greatly impair the overall concept and landscape of katuni, affecting adversely the environment, as well.
4. LEGAL FRAMEWORK

The proposal of the KATUN project is made following the laws of Montenegro, rules of the World Bank and international guidelines. Montenegro, as a candidate for the Member State has imperative to harmonize regulations in the domain of public health and environment protection with EU legislative. In that sense three important drafts of environmental related laws were adopted: Law on Environmental Protection, Law on Environmental Impact Assessment and Law on Integrated Prevention and Pollution Control, in accordance with EU directives; GAP (Good Agricultural Practice) and modern environmental practice.

All actions in environmental management plan of KATUN will be based on:
- Law on Environmental Protection of Montenegro,
- Law on Nature Protection of Montenegro,
- Law on National Parks of Montenegro
- Law on Environmental Impact Assessment (EIA) of Montenegro,
- Law on Waste Management of Montenegro,
- Law on Local-self Government
- Law on Chemicals of Montenegro
- Law on Water of Montenegro
- Law on Agricultural Soil
- Law on Agriculture and Rural Development
- International Best Practice in Safety of Research Laboratories,
- Good Agricultural Practice (GAP) and Good Hygienic practice (GHP)
- Rulebook on classification of waste and waste catalog, "Official Gazette of Montenegro, No. 59/2013"

- Rulebook on quality and sanitary and technical conditions for discharge of waste water into the recipient and public sewage system, the method and procedure of testing the quality of waste water, the minimum number of tests and the contents of the report on the established. "Official Gazette of Montenegro, No. 45/08, 9/10, 26/12 i 52/12, 59/13"
5. PROPOSED PREVENTION AND MITIGATION MEASURES

5.1. Measures during project implementation (EMP Part I)

There is a need for mitigation measures for the following activities in WP1: WP.1.1-characterization of autochthonous livestock breeds, WP. 1.3. Quality control of traditional dairy products on katuns, WP 1.4. Creation of the new dairy products, and also in WP 1.7. Genetic characterization of *P. heldreichi* symbiotic fungi and pathogens.

Here the key environmental safeguard issues are primarily related to laboratory safety and disposal of wastes.

All planned actions in eliminating impact on environment will be on line with the legal framework and International Best Practice in Safety of Research Laboratories in BTF laboratories, and according to Law of Waste Management of Montenegro (also at HMD, TOH).

Further, for all listed activities in WP1, prevention and mitigation measures are needed.

**BTF laboratories**

The Dairy Laboratory is accredited according to the standard MEST/ISO/IEC 17025:2006 and as such is included in the database of World's Dairy Laboratories run by the IDF. Copy of accreditation is in the Annex 2. Dairy lab already proclaimed documents as: Guide for safety work in Dairy laboratory *(Vodič za bezbjedan rad u laboratoriji za mljekarstvo (Pg. 5.5.01)) also as Instruction for waste handling *(Uputstvo za rukovanje otpadom (Pg.55.22-18.01.2010.).*

In the Laboratory for Livestock genetic and in the Laboratory for Forestry research usual best practice in safety of laboratories will be used.

**The existing measures that are already used in the laboratories are:**

- Minimization of materials acquisition of hazardous
- In all laboratories storage refrigerators are in use for storing chemicals.
- Chemicals are stored in proper places with restricted access, not on bench tops or lab hoods and not exposed heat or direct sunlight
- All laboratories do have fire protection system. Laboratories personal already use appropriate personal protection materials to minimize exposure.
- In laboratories is established good housekeeping with decontamination of work surfaces.
- In laboratories is forbidden eating, smoking, handle contact lenses, apply cosmetics, or take medicine.
- The special care is used when using sharps.

During the researches proposed by KATUN project, environmentally safe biochemicals will be used. Besides, there are measures for decontamination/neutralization of toxic waste, we are commonly used.

Liquid waste from Dairy laboratory is checked using method prescribed for this kind of laboratories. If the chemical concentration increased neutralization of the waste is
carried out. For the last 13 years we haven’t had the need for neutralization.

Animal blood sampling (sample size: 3 ml) will be done by the authorised veterinarian for appropriate area (VS Žabljak/VS Podgorica) in accordance with the Law of Animal Welfare, Official Gazette 14/08 and Good Veterinary Practice (DVP).

Additionally, BTF has already got the permission, from Environmental Protection Agency of Montenegro, to collect samples/plant material in Pinus heldreichii forest.

**Measures that will be introduced into the working practices in BTF laboratories**

On the laboratories appropriate warning signs and list of telephone numbers to call in case of accident will be placed. (Laboratory for Livestock genetic and Laboratory for Forestry research- it is already existing practice in Dairy laboratory).

Guide for safe storage, handling and disposal will be prepared, and will be obligatory document in BTF labs (Laboratory for Livestock genetic and Laboratory for Forestry research Dairy laboratory already has it).

**Segregation and disposal of laboratory waste**

All waste produced in BTF labs will be segregated.

We will segregate laboratory plastic (petri dishes, tubes, containers tips for pipets) and glass separately. It will be packed appropriately, autoclaved if necessary, protect against hazards and dispose on special containers which will be placed on BTF (volume of container will be 100-200 m³). From time to time (periodically), the container will be emptied and the contents of the container will be carried at recycling point at Regional recycling center for municipal solid waste.

Sharps will be autoclaved if necessary and collected in puncture-proof containers and fitted with covers, and marked. From time to time (periodically), the container will be emptied and the contents of the container will be carried at recycling point at Regional recycling center for municipal solid waste.

**Companies: HM Durmitor and The Old House**

New dairy products will be created at HMD and TOH, and hence there is a need for mitigation measures for the activities which will be carried out including wastewater management.

During cheese production (dairy production) wastewaters are generated. They will be purified and disposed at the cesspit. Periodically, wastewater from cesspits will be discharged by the responsible institution (JP “Vodovod i kanalizacija”/PC “Water supply and sewage).

During the cheese processing, whay is separated. It will be used as row material for further dairy processing, or as additive for domestic animal nutrition. Accordingly, whay is not a rest in cheese processing.

HMD already produce dairy products, and has working permission. Working permission is
TOH will establish new dairy, and will get working permit, unindependently from the project activities.

**Capacity building for BTF, HMD and TOH staff and institutional arrangement**

On BTF, training on laboratory safety and waste management for all lab workers, including newly engaged MSc students and technical stuff will be organized. Experienced researchers from BTF, also as guest researchers will take lectures on that topic. Guide for safe storage, handling and disposal will be prepared, and will be obligatory document in all BTF laboratories. Expenses of this trainings will be covered by BTF (own contribution) or from other going on projects realized on BTF.

For HMD and TOH stuff special training about GAP (Good Agricultural Practice) and waste management will be organized. The training is planned in activities from WP 1.4 and WP 1.5.

Each of partners will determine a member of PMT who will supervise the implementation of Mitigation Plan, collect the data from Monitoring Plan and be responsible for communication with the with WB and HERIC safeguards staff.

**5.2. Measures regarding possible impacts caused by project outcomes (EMP Part II)**

**Increased production of wastewater from production of new diary products (cheese)**

As already mentioned in chapter 3.2, HM Durmitor has already solved the problem of wastewater. They have the Decision of approving the activity for raw milk collecting and processing issued by Veterinary Directorate. TOH has activities to obtain such Decision. In order to reduce and eliminate the negative impact of waste water from the production of cheese, with the help of experts from the project, HMD will continue to maintain wastewater management system, and TOH will address particular attention to: ensure optimal capacity of biological and septic lagoons and space for solid waste disposal; ensure collection center with adequate space; ensure that the constructed milk collection center will fit into the surroundings; ensure adequate hygienic practices and implemented; prevent waste spills; use green buffer zones for minimization of odor spreading; ensure milk processing facility is not placed in the vicinity of sensitive areas, watercourses, protected areas or similar; ensure proper procedures for maintenance of the milk collection center and milk processing facility as required by Sanitary inspections; ensure that all wastes will be treated according to national Rulebooks. Wastewater must be treated prior to release, or pre-treated if released into sewage network, all in accordance with the local legislation an threshold values that are defined.
Increased grazing and manure within areas where katuns are being rehabilitated.

In addition what was said in the section 3.2 (Possible impacts regarding anticipated project results) of this document, there are some instruments which established long ago, at the time when much higher number of animals were moved to the katuns and overrazing was a problem. Namely, there are non written rules about an exact date when it is allowed to move animals to the katuns. Also, it is regulated who can use certain katun during summer. Places were animals are kept during nights (corrals) are normally cultivated next year and used mainly for potato production, for some cereals and vegetable growing.

Increased visitor and tourist activity in a given area

Due to fact that project activities will result in increased visitor and tourist activity in a given area, project activities will focus on following:

- Developed and clearly marked (hiking) trails, which will represent main tourist routes in area. Those routes will have important role to concentrate visitors along marked trails, easy to control and maintain. In context of routes creation, they should be developed as a means for environmental and cultural interpretation, where main attractions (e.g. natural attractions/scenic views, livestock observation, flora and fauna, etc.) and sensitivity (least impact) should be the primary determining factors in placement. Also, routes development should take into account varying levels of ability for different tourists and they should be clearly delimited, to discourage visitors from leaving them. Circular forms (rather than linear) are more convenient because they bring the visitors back to the starting point. This prevents the visitors from having to retrace their steps, thus improving their experience. Routes creation should take into consideration erosion controls, which is the responsibility of the National Park.
- Promotion of activities that are environmentally more responsible (e.g. hiking, snowshoeing) instead of jeep-tours or hunting;
- Through communication and branding strategy, attract target groups of tourists with higher level of responsibility about environmental issues (e.g. eco-tourists, green tourists);
- Promotion of farmers and tourism offers that are authentic, traditional and original in sense of katun way of living. This will enhance the revitalization of traditional katuns and individual object, with minor modernization (e.g. water storage, solar panels) but in a manner that will not degrade the overall aesthetic appearance of the katuns. In context of architectural design and (re)construction, the existing katun need to be selected to enable the infrastructure to integrate with the natural and cultural environments, rather than build a new katun in a new site. Also, it important to use local wood material with original color and traditional Montenegrin style in the architecture: simple and authentic. Moreover, katun renovation /refurbishment should be based on an understanding of the katun’s context, i.e. the relationship between local cultures and the katun.
- In planned promotional actions, project will promote good practices in sense of water&energy conservation. In context fo energy use and conservation, spring water, sunshine and fires should be considered as the major resources used in katun for light, water and heat sources. Beside the conventional energy source, alternative energy sources should be considered to minimize the environmental impact of this eco-lodge development.
To date, four possible options exist to provide efficient energy source such as solar energy, wind energy, hydroactive systems, and biogas. In addressing issues of energy use and conservation, the developer should draw from Montenegrin vernacular architecture through "passive design" techniques to utilize natural lighting, heating, and cooling for the eco-lodge. They should adopt uses of modern renewable technology, such as solar panels, windmills, biogas digesters, etc., through "active design" to meet energy needs for water heating, lighting, appliances, and cooking. Additional consideration are needed regarding following sources of energy:

- Solar Energy - Factors such as the length of the summer season in the Northern Montenegro region and the costs of implementation should be analyzed before choosing solar energy as the alternative source. It can be assumed that this source of energy will be beneficial from June to September in the eco-lodge for energy production and/or for heating water. Flat-plate solar collectors can be used for heating water for bathrooms and kitchen use. In addition, the use of photovoltaic cells might be considered to convert solar energy into electric energy of 12 volts DC and 110 volts. This technique is relatively economical and easy to install. For installation, the layout of the panels should be done in such a way that it maintains the harmony of the architecture and landscape of the site.

- Wind Energy - Wind power can be used as another source of alternative energy sources. The open plains sweeping down geographically from the Durmitor mountain range make ideal site for wind turbine placement. However, a separate assessment for its potential use should be carried out.

- Hydro active systems - Although small-scale hydro-power plants could be considered as an alternative source of energy, visual pollution of the park could be created.

- Biogas - The use of biogas, especially as heating fuel, has been very successful in other eco-lodges around the world. Processing waste and wastewater produces methane that can be used directly for fueling gas refrigerators, stoves, absorption-chillers, and water heaters.

-Promotional activities will support tourism initiatives that use responsible waste management practices. In context of waste recycling, education of visitors is needed, especially in sense of "leave no trace" programme which promotes the practice to bring all the solid waste back. Also, biodegradable waste should be composted. As per toilets, there should be developed plan of different areas nearby for toilets to use by turns.

-Also, due to several structural development challenges (e.g. lack of infrastructure, energy sources, marketing skills and other products and services important for tourism business), there could be predicted that number of visitors will not raise rapidly. Development of competitive and sustainable agro-tourism offer need time, and in period from 2 to 5 years there could be developed sustainable initiatives, which will represent leaders/champions important for further enhancement of destination product. Anyway, increased number of visitors during the mid-term and long-term period might call for a tourism development plan.

-Project will not promote, enhance or help any initiatives that lead to destruction of traditional katun character in sense of architecture, construction materials, way of living, landscape or other negative environmental practices and impacts;
**Potential to use modern materials and destroy the overall concept of katuns**

During the course of the project, several activities will be conducted in order to contribute to mitigating a possible negative impact of modern materials on the overall concept of *katuni*. Researches will be carried out in order to identify the types and characteristics of local materials used for the construction. Furthermore, specific features of the construction technique will be analyzed, as well as the state of preservation of traditional crafts. After initial researches, guidelines for the protection and revival of *katuni* will be developed, containing recommendations for the restoration of the existing *katuni*, as well as for the construction of the new ones using the traditional materials and building techniques. The workshop, to be held in the second phase of the project, will focus on the topic of sustainable protection and valorization of cultural heritage and landscape of *katuni*. During the workshop, attended by experts from different fields, previously developed guidelines will be analyzed and final guidelines defined. One set of guidelines will refer to the use of traditional materials and building techniques, which imply only manual labor. The second set of guidelines will be related to new interventions with a minimal use of modern elements that could have a negative effect. These guidelines will be prepared in the form of report, which will be available online and distributed to the key stakeholders. We consider that the **Anex 3 - Environmental Management Plan for Specific Construction** will serve as a basic document/guideline.

Furthermore, the results of the project will be used to initiate the process to protect the entire system of *katuns* as a cultural property. This would create conditions for their additional legal protection laying down the use of traditional materials.
# ENVIRONMENTAL MANAGEMENT PLAN Part I

## A) MITIGATION PLAN

(C-Cost of mitigation; R-Responsibility; S- Supervision, observation and comments-to be filled in during supervision)

<table>
<thead>
<tr>
<th>WP</th>
<th>Issue</th>
<th>Mitigating measure</th>
<th>Cost</th>
<th>Responsibility</th>
<th>Supervision</th>
</tr>
</thead>
</table>
| 1.3. | Risk of contamination of soil and water from improperly managed waste from the laboratory sampling (including: analysis of the chemical quality of raw milk; analysis of somatic cells in raw milk; The total number of bacteria in raw milk; Analysis of the chemical quality of milk products) | All testing will be done based on standardized tests: Standard MEST/ISO/IEC 17025:2006
All laboratory works including chemical storage and waste management will follow the defined: Guide for safety work in laboratory ((Pg. 5.5.01)) Instruction for handling waste (Pg.55.22-18.01.2010.).
Handling of waste will include: separate collection and storage of laboratory waste, including sharps, which will be autoclaved if necessary and collected in puncture-proof containers and fitted with covers, and marked.
Collected and separated laboratory waste will by delayed at recycling point. | NO | BTF Dairy laboratory |

| 1.2. | Risk of contamination and health risks from animal blood sampling | Expert from authorized veterinary institution (VS Žabljak or VS Podgorica) will sample animal blood, in accordance with Law of Animal Welfare (Sl. List 14/08) and Good Veterinary Practice (DVP) | Planned in WP1 – Task 1.2 | BTF, Laboratory for livestock genetic |

| 1.2. | Risk of contamination of soil and water from improperly managed waste from the laboratory sampling due to: genetic | Labeling inventory will be properly done
Storage refrigerators are in use for storing biochemical Environmentally friendly biochemicals and kits will be used
Chemicals are stored in | NO | BTF, Laboratory for livestock genetic |
| 1.2. | Risk to the environment (landscape impacts, waste generation, new construction, land use, dust and noise) from forming of new farms at Kuć Mountain | Obtaining the EIA permit or development of the EMP Sound construction measures will be applied Careful planning of the locations of the farms will be conducted as to minimize any cumulative impacts | YES, costs of the TOH | TOH |
| 1.7. | Risk to the threaten to protected plant species due to collection of *P. heldreichii* needles (biodiversity) | Obtaining the permit of EPA MNE | NO | BTF Laboratory for forestry research |
| 1.7. | Risk of contamination of soil and water from improperly managed waste from the laboratory sampling due to genetic characterisation of symbiotic fungi and pathogens | Labeling inventory will be properly done Storage refrigerators are in use for storing biochemical Environmentally friendly biochemicals and kits will be used - Chemicals are stored in proper places with restricted access - Personal protection materials and equipment will be used | NO | BTF Laboratory for forestry research |
| 1.5. | Risk of contamination of raw material | Milking in accordance to the hygienic standards  
Immediately after milking cooling and storage of milk in the cooling tanks  
Everyday cleaning and washing of the premises used for milk processing and storage of the dairy products  
Separation of waste waters (waste waters disposal) in accordance with the water laws and water permits for such activities  
All solid wastes will be handled by licensed companies | NO | HMD |
| 4. | Risk of non-adequate handling with laboratory goods and chemicals which could endanger stuff health, also as environment | Training of the BTF staff on the laboratory safety and the hazardous waste management | NO (BTF contribution) | BTF |
| 1.4. | Risk of non-adequate dairy plant waste management | Training for the companies staff (HMD, TOH) related to GAP and waste management | Planned in WP1-Task 1.4. | BTF, HMD, TOH |
### B) MONITORING PLAN

<table>
<thead>
<tr>
<th>WP</th>
<th>What parameter is to be monitored?</th>
<th>Where is the parameter to be monitored?</th>
<th>How is the parameter to be monitored/type of monitoring equipment?</th>
<th>When is the parameter to be monitored - frequency of measurement or continuous?</th>
<th>Monitoring Cost What is the cost of equipment or contractor charges to perform monitoring?</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3.; 1.2.; 1.7.</td>
<td>Management with the laboratory waste materials</td>
<td>Labs at the BTF</td>
<td>Internal inspections will be undertaken</td>
<td>twice per year</td>
<td>NO</td>
<td>BTF</td>
</tr>
<tr>
<td>1.5.</td>
<td>Veterinary certificate issued by Vet. administration of MNE</td>
<td>HMD</td>
<td>Reviewing of the permit</td>
<td>yearly</td>
<td>NO</td>
<td>HMD, BTF</td>
</tr>
<tr>
<td>1.2.</td>
<td>Permits for establishing goat and sheep farms and dairy or developed EMP</td>
<td>TOH</td>
<td>Reviewing of the permits</td>
<td>Prior to start of any works on the farms all permits need to be obtained. After that parameters in the permit will be monitored as per intervals defined in the permits themselves.</td>
<td>NO</td>
<td>TOH, BTF</td>
</tr>
<tr>
<td>4.</td>
<td>Training of the BTF staff related to the lab safety and hazardous waste management</td>
<td>BTF</td>
<td>Report on training</td>
<td>After 1 year (march 2016)</td>
<td>NO</td>
<td>BTF</td>
</tr>
<tr>
<td>4.</td>
<td>Guide for safe storage, handling and disposal will be prepared</td>
<td>BTF</td>
<td>Guide will be exposed in the labs and available to all users</td>
<td>After 6 months (October 2015)</td>
<td>NO</td>
<td>BTF</td>
</tr>
<tr>
<td>1.4.</td>
<td>Training about GAP and waste management</td>
<td>BTF</td>
<td>Report on training</td>
<td>After 9 month (January 2016.)</td>
<td>NO</td>
<td>BTF, HMD, TOH</td>
</tr>
</tbody>
</table>
ENVIRONMENTAL MANAGEMENT PLAN
Part II

A) MITIGATION PLAN

All impacts covered by this Mitigation Plan are anticipated to be important in the wider concept and outside of the Project scope. Proposed measures should serve as recommendations for future activities. Consequently, persons, enterprises, organizations, associations, etc. which will be engaged in these activities will also bear the responsibility for mitigating the impacts as well as the adequate costs.

<table>
<thead>
<tr>
<th>WP</th>
<th>Issue</th>
<th>Mitigating measure</th>
</tr>
</thead>
</table>
| 1.1.5 | Risk of water pollution induced by increased production of new diary products (cheese) | Training of the farmers (Good agriculture practice)  
Compliance of larger farms with the environmental and water legal provisions |
| 3.1  | Risk of pollution of the environment because of increased number of visitors and tourist activity in a given area. | Preparation of the guidelines and standards for sustainable tourism development |
| 1.2.  | Risk of biodiversity loss and deforestation induced by increased grazing within areas where katuns are being rehabilitated. | Training of the farmers (Good agriculture practice)  
Rotation and planned grazing  
Planned manure management  
Preparation of the guidelines |
| 1.2.  | Risk of exceeding of nutrient level in the soil induced by presence of manure within areas where katuns are being rehabilitated. | Training of the farmers (Good agriculture practice)  
Planned manure management  
Preparation of the guidelines |
| 3.3.  | Risk of destroying of the overall concept of *katuns* induced by possible use of modern materials | Preparation of the guidelines and standards for sustainable tourism development/  
Workshop sustainable protection and valorization of cultural heritage and landscape of *katuni*.  
Preparation of guidelines for restoration of
katuns and construction of the new ones using traditional materials

Possible registration of the traditional katun design

B) MONITORING PLAN

All parameters that should be monitored within this Monitoring Plan are anticipated to be important in the wider concept and outside of the Project scope. Proposed monitoring should serve as recommendations for future activities. Consequently, persons, enterprises, organizations, associations, etc. which will be engaged in these activities will also be responsible for implementation of Monitoring plan as well as for possible costs, in accordance to valid Montenegrin legislation.

<table>
<thead>
<tr>
<th>WP</th>
<th>What parameter is to be monitored?</th>
<th>Where is the parameter to be monitored?</th>
<th>How is the parameter to be monitored/type of monitoring equipment?</th>
<th>When is the parameter to be monitored - frequency of measurement or continuous?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5</td>
<td>Quality of water and possible pollution induced by increased production of new dairy products (cheese)</td>
<td>Facilities of the HMD, TOH and all new producers (i.e. potential polluters)</td>
<td>According to valid legislation related to waste water</td>
<td>According to legal requirements</td>
</tr>
<tr>
<td>3.1</td>
<td>Pollution of the environment (amount of hard waste) because of increased number of visitors and tourist activity in a given area.</td>
<td>On main tourist roads (tours) and visitor spots (Kuči and Durmitor regions)</td>
<td>Observations and monitoring by volunteers and farmers</td>
<td>Seasonal or periodical monitoring (depends on the frequency of the visits)</td>
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<tr>
<td>3.2.</td>
<td>On main tourist roads (tours) and visitor spots (Kuči and Durmitor regions)</td>
<td>Observations and monitoring by volunteers and farmers</td>
<td>Reports</td>
<td>Competent authorities (i.e. inspection) according to legal requirements</td>
</tr>
<tr>
<td></td>
<td>Observations and monitoring by volunteers and farmers</td>
<td>Reports</td>
<td>Compliant book from farmers</td>
<td></td>
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<tr>
<td></td>
<td>Compliant book from farmers</td>
<td>Implementation of the Law on local selfgovernment (related to communal activities), Law on municipal police, Law on environment, Law on waste management.</td>
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<td></td>
<td>Implementation of the Law on local selfgovernment (related to communal activities), Law on municipal police, Law on environment, Law on waste management.</td>
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<tr>
<td>1.2</td>
<td>Biodiversity loss and deforestation induced by increased grazing within areas where katuns are being rehabilitated.</td>
<td>Throughout the region where katuns are being rehabilitated</td>
<td>According to observations and monitoring regarding destruction/changes in plant community structure</td>
<td>Regular intervals (seasonal observations and reviews)</td>
</tr>
<tr>
<td></td>
<td>Throughout the region where katuns are being rehabilitated</td>
<td>According to observations and monitoring regarding destruction/changes in plant community structure</td>
<td>Discussion with farmers and experts</td>
<td></td>
</tr>
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<td>Discussion with farmers and experts</td>
<td></td>
</tr>
<tr>
<td>1.2.</td>
<td>Nutrient level in the soil induced by increased manuring within areas where katuns are being rehabilitated.</td>
<td>On locations where manure is being disposed of (if collected and disposed)</td>
<td>Examination of the soil quality according to Law on agriculture land (owners of the land will engaged authorized laboratory)</td>
<td>Every five years</td>
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<td></td>
<td>On locations where manure is being disposed of (if collected and disposed)</td>
<td>Examination of the soil quality according to Law on agriculture land (owners of the land will engaged authorized laboratory)</td>
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<td></td>
</tr>
<tr>
<td>3.3.</td>
<td>destroying of the overall concept of katuns induced by possible use of modern materials</td>
<td>At the sites of old and new katuns</td>
<td>Visual inspection of compliance with the recommended guidelines</td>
<td>Once per year (season)</td>
</tr>
<tr>
<td></td>
<td>At the sites of old and new katuns</td>
<td>Visual inspection of compliance with the recommended guidelines</td>
<td>Implementation of the European Landscape Convention</td>
<td></td>
</tr>
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<td>At the sites of old and new katuns</td>
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Attachments

1. Copy of the permit issued by the EPA for perform researches/collection of *Pinus heldreichii* samples

2. Copy of Accreditation Certificate for Biotechnical faculty, Dairy Laboratory

3. Copy of work permit issued by Veterinary Directorate for HM Durmitor for milk processing

4. Copy of Accreditation Certificate for Specialised Veterinary Laboratory, Džordža Vašinktona bb, 81 000 Podgorica

Annexes

Annex 1: Report on Public Consultation (will be prepared)

Annex 2: Environmental Management Plan for milk collection and processing systems

Annex 3: Environmental Management Plan for Specific Construction
Attachment 1. Copy of the permit issued by the EPA for perform researches/collection of Pinus heldreichii samples
Attachment 2. Copy of Accreditation Certificate for Biotechnical faculty, Dairy Laboratory
AKREDITACIONO TIJELO
Crne Gore
ACCREDITATION BODY
of Montenegro
Podgorica

ATCG – 0034

Na osnovu člana 10. Zakona o akreditaciji dodjeljuje
Pursuant to the Article 10. of the Law on Accreditation Issuer:

SERTIFIKAT O AKREDITACIJI
Accreditation Certificate

kojim se potvrđuje da organizacija
which confirms that:

UNIVERZITET CRNE GORE
BIOTEHNIČKI FAKULTET
Laboratorija za mljekarstvo
Uč-Mihaila Lalića br. 1, Podgorica

Li 10.07
akreditacioni broj
accreditation number

zadovoljava zahtjeve standarda
meets requirements of

MEST EN ISO / IEC 17025: 2011

i kompetentna je za obavljanje poslova ispitivanja
and is being competent for performing the accreditation tasks

koji su specifikani u utvrđenom obimu akreditacije
which are specified in the defined scope of accreditation

Datum dodjeljivanja akreditacije: 08.07.2014.god.
The date of the accreditation granting:

Accreditation valid until:

Ranko Nikolić
Direktor
Director
Dodatak Sertifikatu o akreditaciji - identifikacijski broj: 0034
Annex to Accreditation Certificate - Identification Number: 0034

Datum izdavanja dodatka: 08.07.2014.
Issuance date of annex: 08.07.2014
Zamešnje: Jelena Jelenić
Representative Annex Annex:


Datum dodjelije/obnavljanja akreditacije:
Date of granting/renewal of accreditation
08.07.2014./ 07.07.2018

Accreditation is valid to: 07.07.2018.

Akreditovana laboratorija za ispitivanje
Accredited laboratory of testing

Univerzitet Crne Gore
Biotehnički Fakultet
Laboratorija za mljevarstvo
Ul. Mihaila Lalića br. 1, Podgorica

University of Montenegro
Biotechnical Faculty
Dairy Laboratory
Ul. Mihaila Lalića br. 1, Podgorica

Područje akreditacije / Scope of accreditation:
Fizičko-chemijska i mikrobiološka ispitivanja surovin mljeva
Physical-chemical and microbiological analysis of raw milk
Attachment 3. Copy of work permit issued by Veterinary Directorate for HM Durmitor for milk processing
Pravna pouka: Protiv ovog rješenja može se izjaviti žalba Ministarstvu poljoprivrede i ruralnog razvoja u roku od 15 dana od dana prijema rješenja.

Dostavljeno:

- Doo „HM Durmitor“ Zabljak
- Veterinarske inspekcije Pljevlja
- Službi
- A/a

DIREKTOR

Ivan Popović
Attachment 4. Copy of Accreditation Certificate for Specialised Veterinary Laboratory, Džordža Vašinktona bb, 81 000 Podgorica
Dodatak Sertifikatu o akreditaciji - identifikacioni broj: 0017
Annex to Accreditation Certificate – Identification Number: ATCG-0017

Issue date of annex: 15/04/2013.

Dodatak Sertifikatu o akreditaciji sa akreditacionim brojem Li 11.14
Annex to Accreditation Certificate - Accreditation Number Li 11.14


Accreditation is valid to: 20/04/2015

Akreditovana laboratorija za ispitivanje
Accredited laboratory of testing

Specijalistička Veterinarska Laboratorija
Djordža Vasića bb, Podgorica

Diagnostic veterinary laboratory
Djordža Vasića bb, Podgorica

Područje akreditacije / Scope of accreditation:

- Mikrobiološka ispitivanja hrane životinjskog porijekla: meso i proizvodi od mesa, mlijeko i proizvodi od mlijeka, jaja i proizvodi od jaja
  Parazito loška ispitivanja mesa i proizvoda od mesa
  Mikrobiološka, serološka i imunološka i parazito loška ispitivanja biološkog materijala (organski sekre ti, ekskre ti, tkiva, tkivne tečnosti, brisevi)
  Microbiological testing of food of animal origin: meat and meat products, milk and dairy products, eggs and egg products
  Parasitological testing of meat and meat products
  Microbiological, serology, immunology and parasitological testing of biological materials (organic secretion, excretion, tissues, tissue liquids, swabs)
Annex 1: Report on Public Consultation (will be prepared)
# Annex 2: Environmental Management Plan for milk collection and processing systems

## Environmental Management Plan for milk collection and processing systems

<table>
<thead>
<tr>
<th>Phase</th>
<th>Issue</th>
<th>Mitigating Measure</th>
<th>Monitoring Measures</th>
<th>Install / Operate</th>
<th>Monitor</th>
<th>Install / Operate</th>
<th>Monitor</th>
<th>Cost</th>
<th>Institutional Responsibility</th>
<th>Comments (e.g. secondary impacts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>Dust and noise generated during construction</td>
<td>Limit work on site to times when noise disruptions are allowed</td>
<td>Monitor complaints from neighbors, visually ensure dust generation is acceptable</td>
<td>1 m3 of water for dust suppressing:</td>
<td>Workers / Contractors</td>
<td>Contract or and Client</td>
<td></td>
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</tr>
<tr>
<td>Construction</td>
<td>Exhaust emissions and vibrations from the machinery</td>
<td>Ensure use of best available machinery Do not allow machinery to idle</td>
<td>Monitor types of machinery used and idle running</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cost of excavating 1m3 of soil with spill:</td>
<td>Workers / Contractors</td>
<td>Contract or and Client</td>
</tr>
<tr>
<td>Construction</td>
<td>Soil pollution caused by oil and grease leakage</td>
<td>Maintenance of machinery at approved sites Storage of machinery on non-permeable surfaces Clean-up of spills</td>
<td>Visually inspect for signs of leaks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cost to transport waste per kilometer to site (approximately 20 km):</td>
<td>Workers / Contractors</td>
<td>Contract or and Client</td>
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<tr>
<td>Construction</td>
<td>Soil and water pollution from improper waste management</td>
<td>Ensure proper waste management at designated landfill sites Maximize reuse, especially of inert materials and useful topsoil</td>
<td>Visually Maintain receipts from designated landfill site for all construction wastes</td>
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<td></td>
<td>Workers / Contractors</td>
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</table>

- **Cost**: Cost of excavating 1m3 of soil with spill: COST 1m3 = 3.5-5 euro
- **Workers / Contractors**: Cost to transport waste per kilometer to site (approximately 20 km): Cost 20km = 3.5-5 euro
- **Contract or and Client**: Cost of excavating 1m3 of soil with spill: COST 1m3 = 3.5-5 euro
- **Workers / Contractors**: Cost to transport waste per kilometer to site (approximately 20 km): Cost 20km = 3.5-5 euro

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Cost (e.g. secondary impacts)
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<tbody>
<tr>
<td>Operation</td>
<td>Odor generation</td>
<td>Ensure collection center is adequately spaced from sensitive neighborhoods</td>
<td>Monitor complaints from neighbors</td>
<td>Greenery for 1 m length COSTS 60-80 euro length COSTS Covers COSTS</td>
<td>Final user /farmer</td>
<td>Contractor and Client</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Ensure adequate hygienic practices are established and implemented</td>
<td>Sanitary inspection approval</td>
<td></td>
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<td></td>
<td></td>
<td>Prevent spills into areas that are hard to clean up</td>
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<td></td>
<td>As final instance use green buffer zones for minimization of odor spreading</td>
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<tr>
<td>Operation</td>
<td>Aesthetic degradation</td>
<td>Ensure that the constructed milk collection center will fit into the surroundings</td>
<td>Visually monitor, review of design and final location selection</td>
<td></td>
<td>Final user /farmer and workers</td>
<td>Contractor and Client</td>
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</tr>
<tr>
<td>Operation</td>
<td>Safety for environment</td>
<td>Ensure milk collection center is not placed in the vicinity of sensitive areas, watercourses, protected areas or similar</td>
<td>Visually ensure design and location of collection milk center is not causing environmental threats</td>
<td></td>
<td>Final user /farmer and workers</td>
<td>Contractor and Client</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Safety for end users</td>
<td>Ensure proper procedures for maintenance of the milk collection center as required by Sanitary inspections</td>
<td>Compliance with procedures with spot checks</td>
<td></td>
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<tr>
<td></td>
<td>Poor hygiene may lead to odors and health threats</td>
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</tbody>
</table>
### Environmental Management Plan for milk collection and processing systems

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<th>Cost</th>
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<th>Comments (e.g. secondary impacts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation – further milk processing</td>
<td>Pollution from improperly managed wastes</td>
<td>All wastes that are not used in the production process to be separated if possible, recycled if feasible and as a final instance to be disposed of in line with the local regulations and through authorized agencies</td>
<td>Visually ensure design and location of collection milk center is not causing environmental threats</td>
<td>Cost</td>
<td>Final user /farmer and workers</td>
<td>Contract or and Client</td>
</tr>
</tbody>
</table>
## Annex 3: Environmental Management Plan for Specific Construction

<table>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Construction</strong> activities need to follow traditional practices and use of materials</td>
<td>Ensure materials and practices are traditional</td>
<td>Review materials and construction practices against traditional ones</td>
<td></td>
<td></td>
<td>Workers / Contractors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ensure opinions and approvals of all local authorities are met</td>
<td>Mandatory submission of complete design in application</td>
<td></td>
<td></td>
<td>Contractor and PMU</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(especially if the activity shall include any protected structures)</td>
<td>Such practices may incur additional costs and should be included in design</td>
<td></td>
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</tr>
<tr>
<td></td>
<td><strong>Construction</strong> needs to ensure that the object is aesthetically acceptable to the surroundings</td>
<td>Use natural materials for watering points/terraces</td>
<td>Review of materials used and the design documentation</td>
<td></td>
<td></td>
<td>Workers / Contractors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ensure compliance with the authentic design for katuni and other structures</td>
<td></td>
<td></td>
<td></td>
<td>Contractor and PMU</td>
</tr>
<tr>
<td>Phase</td>
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</tr>
<tr>
<td>Construction</td>
<td>Construction may use natural materials such as wood or stone that are obtained through depletion of natural resources</td>
<td>Ensure adequate and authorized procurement of stone and wood. Ensure authorized logging of wood, as approved by the designated authority (Uprava za šume Crne gore – the Forestry Management of Montenegro) and with due consideration to the environment</td>
<td>Monitor sources of materials and approvals/receipts</td>
<td>Install / Operate</td>
<td>Monitor</td>
<td>Install/ Operate</td>
</tr>
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<td>Phase</td>
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<tr>
<td>Construction</td>
<td>Soil and water pollution from improper waste management</td>
<td>Ensure proper waste management at designated landfill sites</td>
<td>Visually</td>
<td>Cost to transport waste per kilometer to site</td>
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<td></td>
<td>Maximize reuse, especially of inert materials and useful topsoil</td>
<td>Maintain receipts from designated landfill site for all construction wastes</td>
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<td></td>
<td></td>
<td></td>
<td>Visually inspect storage facilities for hazardous materials or waste.</td>
<td>Cost of transport and disposal</td>
<td>Workers / Contractors</td>
<td>Farmer, Workers and PMU</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>Hazardous materials will not be used</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Hazardous materials</td>
<td>All hazardous materials or waste will be stored in a safe place to minimize risk of accidental contamination water, air or soil</td>
<td></td>
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<tr>
<td>Construction</td>
<td>Contamination of soil and/or ground water caused by releases of wastewater or liquid waste</td>
<td>Ensure all wastewater is collected in leak proof septic tanks which are regularly emptied</td>
<td>Visually inspect that there are no releases of wastewater or liquid wastes into the environment</td>
<td>Cost of transport and disposal</td>
<td>Workers / Contractors</td>
<td>Farmer, Workers and PMU</td>
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