



*FAO Slovenian wood biomass project*

Supply and utilization of Bioenergy to  
promote Sustainable Forest Management



# Charcoal Use and Trade in Slovenia

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Jože Prah

REPUBLIC OF  
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MINISTRY OF AGRICULTURE,  
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SLOVENIA  
FOREST  
SERVICE



# Charcoal use and trade in Slovenia

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## 1. CHARCOAL PRODUCTION IN SLOVENIA

### 1.1. Charcoal production methods in Slovenia

Charcoal production in piles is a method which used to be spread throughout all continents and was by far the most wide spread one. And as such it has been preserved until today.

We know different forms and sizes of charcoal piles and there are different ways of charcoal pile building. Today, vertical, classical piles are used above all (we know also Swedish piles). In vertical piles wood is stacked vertically or slightly inclined. All the logs must be of the same length and it is also desirable they are of the same diameter, as much as possible. Charcoal burning in vertical piles is suitable for all kinds of wood, even though all kinds of wood don't give a good quality charcoal. It is desirable for the pile to as homogenous as possible (made of one kind of wood or different kinds with similar physical-chemical characteristics).

Today, our charcoal burners make piles that are similar to the German method. In the centre, the pile has a vertical chimney through which the pile is lit. Around it, logs are stacked and then covered with a layer of needles and a layer of soil, which enables air to flow in, otherwise the pile would burn out. At the ground a small opening is made to allow air to flow in to the chimney where fire must never burn, just smolder. (picture 1) According to original German method, logs are stacked on the ground and they make air-tight ground (any influx of air must be enabled). As this is very hard to reach with logs, here, instead of wooden floor, floor made of well pressed soil (soil containing clay as the best). This is the only correction charcoal burners in Slovenia have made using it (today it is by far the most popular charcoal burning method).

Picture 1: Charcoal Pile



## 1.2 Charcoal production locations

As a sideline, charcoal production appears in the Charcoal-burning land, around Dole pri Litiji with about 180 tons of charcoal produced annually and in Selca under Sv. Mohor with about 120 tons of annual production.

The rest of charcoal production has above all a tourist character and appears on different locations in Slovenia.

Besides Charcoal-burning land and Selca, we can find charcoal production also in:

- Gorjanci
- Radovna
- Stranje nad Blanco
- Boč
- Pokljuka
- Kranjska gora
- Mislinja
- Škofjeloško hribovje
- Svetina
- Podgora
- Pohorje
- Logarska dolina
- Vitanje
- Selnica ob Dravi
- Bresternica
- And elsewhere

Around 80 tons of charcoal is produced on these locations.

Total production of high quality charcoal, in average, is from 300 to 350 tons.

## 1.3. Quantities of charcoal production

Year	Import (tons)	Home production (tons)
2003	240	360
2002	300	320
2001	290	350
2000	280	270
1999	310	340
1998	320	330
1997	340	310
1996	350	300
1995	360	300
1980		400
1975		400
1970		448
1965		3000
1960		4400
1955		7300



## 2. DESCRIPTION OF CHARCOAL BURNING PROCEDURE

### 2.1 Preparation of the charcoal pile site

For a better quality of charcoal or for a more even carbonization of the charcoal pile, selection of the charcoal pile site is very important. The charcoal pile site must be flat, slightly elevated in the centre, with an inclination of about 5% which enables water and distillates to flow away. Flattening the charcoal pile site, charcoal burner has to remove all stumps, roots and rocks. The size depends above all on the size of piles charcoal burner will be doing on the site. For a middle-sized charcoal pile, the site has to have a diameter of 10m. The larger the flat surface, the easier is the work at the site. In order to direct the water away from the charcoal pile, the charcoal burner makes a drainage shaft at the side of the charcoal site so that water cannot moisten the pile. The floor under the pile must not be too airy, therefore sometimes, when a new pile is being made, the floor is hardened with a layer of clay. The layer of clay is about 50 cm thick and hardened so that the floor of the pile is air tight as much as possible or evenly airy. Usually the site for the pile is chosen at the foot of the plot of land, near the water, therefore good hardening is important because air circulation is much bigger near a stream. It is ideal to burn charcoal on an old charcoal pile site, sheltered from wind.

Nowadays, charcoal burners mostly have pile sites near their homes because of electricity and water. With the development of skidding and transportation technology they can easily bring wood home. It is easier to control the carbonization process as well as bagging and transportation.

### 2.2 Preparation of wood

The quality of charcoal depends to the largest extent on the species of wood and its characteristics, for example: humidity, age, soundness, form and dimensions of wood. Every species of wood has a different anatomic constitution, chemical structure and mass, which is why every species requires different temperature for carbonization. It is advisable to carbonize each species separately, especially conifers and broadleaved separately. Certain soft broadleaved trees require the highest temperature for carbonization, about 12 to 15°C higher in comparison to beech-wood and other hard broadleaved species.

The speed of carbonization, too, is different regarding tree species. In this area, nowadays, charcoal is made mostly of broadleaved trees while the share of conifers is negligible and is usually added to broadleaved wood in smaller quantities. In the past iron works used to demand charcoal made of conifers because it is lighter than charcoal made of broadleaved wood. In the past charcoal was taken and bought in cubic measures while nowadays it is being paid by weight. Therefore, in Dole, the majority of charcoal is made of hard



broadleaved tree wood. Broadleaved tree wood, too, is divided into wood which gives heavy charcoal and wood which gives light charcoal.

Heavy charcoal is obtained from: beech, sessile oak, turkey oak, maples, ash-tree, European mountain ash, pear, crab apple. Lighter charcoal is obtained from: alder, birch, elm-tree, poplar, willow, lime, cherry. In the charcoal burners' opinion the best charcoal is obtained from beech, European hornbeam, sessile oak and hazel-wood.

Humidity is important because it affects the speed of the carbonization. When it evaporates inside the pile it increases air circulation which speeds up irregular carbonization of wood. In the part of the pile with more humidity wood is carbonized too fast and the charcoal burner has to add it. Charcoal from such a part cracks in a radial direction and is therefore smaller, specifically lighter, breaks fast and is of inferior quality at first sight. According to higher humidity of wood, these characteristics are increasing in a negative sense.

The age of wood also affects the characteristics of charcoal. Charcoal obtained from younger wood is better, heavier and does not break as much as charcoal obtained from older wood. Old and rotten wood produces more gasses and pressure in the pile which makes control of cooking more demanding.

Dimension and form of wood affect carbonization as well. For the production of high quality charcoal, charcoal burners usually use logs in forms of "kalanice" (split wood) and billets from 2cm thickness on. The thinner and shorter the logs are, the higher the temperature at carbonization and the easier the charcoal cooking are. So logs in the form of billets of a diameter from 2 to 8cm and of about 1,2 m long give the best quality charcoal. Charcoal burners call this charcoal "kanela".

Charcoal production gives the opportunity of utilization of waste wood, which usually remains on the cutting site, that is branch-wood, tops, remains after wind-breaks, snow-breaks and wood from first and second thinnings.

In this way menace of fires and multiplication of insects is reduced and the quality of stands, in the silvicultural sense, is improved.

### **2.3 Charcoal pile building**

First, charcoal burners bring logs around the site and then they start stacking them. The best for cooking are air-fried logs with about 20 to 25% of humidity.

According to the way of stacking we know standing piles, where wood is stacked vertically and horizontal piles with logs stacked horizontally. The latter used to be more frequent in Northern Europe and were used for the carbonization of conifers. In our country, building of



vertical piles, similar to the German method, has prevailed but in most cases local people do not put wood on a floor, made of "kalanic" or billets, put on the ground in a radial direction. They put logs directly on the ground, as floor making is a work taking up very much time and many times the floor collapses which makes the pile sink down without control. The form of the pile must be parabolic and stacked into a circle as precise as possible. Oval form of the pile causes irregular carbonization of wood which makes the charcoal of inferior quality.

The most frequent in this area are middle-sized charcoal piles, which give about 6 tons of charcoal.

In the centre of the charcoal pile site charcoal burners ram in three, about 5 cm thick, straight poles, in a form of a triangle with sides from 25 to 35 cm. These poles are called "strženice"(pith poles). Most frequently, charcoal burners use dead pine trees and tie them between themselves with hoops made of clematis or they use ready made metal hoops for multiple use. These hoops are usually fixed, according to the length of the logs, in most cases at the height of 1m and then in equal distances towards the top. If the logs are shorter, distances between the hoops are shorter. Hoops serve to keep "strženice" the pith poles apart and charcoal burners lean logs on them. Thus, an empty space appears in between which reminds of a chimney and is called pith. On the bottom, most charcoal burners put two splinters in a form of a cross for good luck at charcoal burning.

Around the pith, charcoal burners start stacking logs in a form of rings of logs. In that, the following general rules are respected:

- wood is stacked as dense as possible,
- thicker logs are stacked in the centre and thinner logs towards the outside,
- humid logs are stacked in the upper layer, with their fat ends pointing downwards.

If wood is not stacked dense enough, empty space appears between logs which makes air circulate easier. Thus carbonization is faster, at a higher temperature, wood is dried faster, therefore wood sinks down and deforms the form of the pile. The quantity of steam rises, so does the pressure, which can cause the soil cover of the pile to be thrown off. Sometimes these gases start burning and charcoal burners say that the pile puffs or erupts.

Fat wood is stacked in the centre because the temperature around the pith is the highest and this kind of stacking corresponds to distribution of temperature in the pile. On the periphery thinner wood is stacked which to a certain extent prevents reduction of temperature on the periphery.

Humid wood is stacked in the upper layer and dry wood is stacked in the bottom one which makes humid logs dry faster.



Most frequently charcoal burners make piles with two layers of logs and they form the head of the pile on the upper layer. It is made of shorter logs or of remains of the former pile. Here, wood does not exceed 40 to 50 cm and is stacked in a radial direction, inclined towards the pith. The first layer is stacked at an angle of 75° and the other one at a little bigger angle so that at "osipanje" (earthing) the earth remains on the pile. Thus, softly inclined piles are considered better than steep ones also because of wind which can blow away earth and foliage cover. Usually charcoal burners load both layers of logs at the same time as work is done faster this way.

The level between both layers is called "sklep" joint and the level between the upper layer and the head is called shoulders. When the charcoal burner cuts off the "strženice" pith poles on top of the head, the piles are loaded.

## **2.4. Charcoal pile coating**

### ***2.4.1 Preparation of the charcoal pile for blackening***

The loaded pile must be formerly prepared for a layer of earth or the so called blackening. To do that, charcoal burners, before putting up a layer of earth, cover the pile with a layer of pine needles, foliage, hay or fresh grass, whatever they dispose of. This layer is called "grasa" or coat, and coating is called "grasanje".

The layer must be about 10 to 15 cm thick so that it prevents the earth to pour in between the logs. In this area, charcoal burners usually load pine branches up to the first layer, which later enables them to separate earth from the charcoal much easier. It the layer with the biggest quantity of charcoal is covered with foliage or hay, "grasa" and earth mix with the charcoal at the time of unloading, therefore the unloading is more demanding. Above the first layer, logs are usually coated with hay or foliage. The pile is ready for blackening.

### ***2.4.2 Blackening of the charcoal pile***

The most suitable soil for coating is pure humus soil with as little clay particles as possible, as in the cooking phase, due to high temperatures, they stick into lumps. There is a great possibility for air to break into the pile at such a point. The best is the soil brought from an old charcoal pile site, already burnt and mixed with charcoal dust. This is also the most frequently used soil at the charcoal sites, located close to home. The soil is ready to be applied when it's neither too humid nor too dry. This is the only way it can remain on top of the pile as charcoal burners make a layer of 10 to 15 cm. they say it should be as thick as the height of the four fingers and a straight thumb of the hand. This layer prevents air from the outside to enter



inside the pile and at the same time keeps gasses and water vapor, made at cooking, inside the pile.

Charcoal burners begin with the coating of the pile at its foot, where the layer of soil must be the thickest. After that they put up soil upwards and in width simultaneously and they beat it at the same time. When the pile is coated up to the first layer, around the entire periphery, they start with blackening of the second layer. Here, the soil coat is a little thinner and towards the head it gets a little thicker again. When blackening is finished they put "kalanice" (billets) vertically and horizontally on the soil to keep the soil together and press it over the logs. Charcoal burners call these "kalanice" billets "špire" and the distance between them is the length of logs and at the same time they serve for walking around the pile. On the second layer they only put "kalanice" billets vertically, not horizontally. They do not coat the pith, therefore it is covered with a lid while the pile is being coated. The lid can be an ordinary board or tin-plate which is later removed. Some charcoal burners use clematis hoops instead of "špire" which are put at the height of the first layer and between the head and the second layer. They put soil on the upper side of the hoops which makes a support for walking around the pile. The upper hoop is removed after carbonization and serves for multiple use. Charcoal burners do the same with the second hoop. They say hoops are better in keeping the soil and reducing the possibility for the pile to puff or erupt. Pile, loaded this way, is ready to be lit.

## **2.5. Cooking or carbonization**

### ***2.5.1 Carbonization process***

Expression carbonization means physical and chemical process of transformation of wood into charcoal. We have to understand the difference between carbonization and charring which represents all phases of work, from lighting to unloading or so called "štoranje" sticking of the pile. Carbonization runs at a temperature from 240 to 280°C, which differs according to species, thickness and quality of wood and with a restricted access of air. Charcoal can be produced in three ways:

- in charcoal piles,
- in charcoal stoves,
- with a dry distillation without access of air.

Charcoal, produced in charcoal stoves and with dry distillation is called retort charcoal. In the carbonization process, besides charcoal, wood vapor is produced, which cools and becomes liquid. Methyl alcohol, terpenes and wood tar are produced. Charcoal is an amorphous form of carbon or irregular structure of graphite, which is, together with diamond, the main allotropic form of carbon.



Wood charcoal is defined by the formula  $C_{32}H_{10}O_2$ . It consists of carbon (80 to 90%), oxygen and nitrogen (5 to 15%), hydrogen (2 to 4%), ashes (2 to 3%) and hygroscopic humidity (5 to 10%). When charcoal burns at a temperature lower than 1000°K, carbon dioxide is produced and above this temperature carbon monoxide is produced. Charcoal keeps only half of the wood's volume and a quarter of the wood's mass but its burning value is twice as big (about 7000 kcal.). The reason for that is reduction of humidity and in chemical changes which cause the loss of gassy and liquid distillates. From 5 kilos of wood, 4 kilos of different distillates are extracted during the process of charring, only 1 kilo of charcoal remains.

### ***2.5.2 Lighting of the charcoal pile***

Charcoal burners light the centre of the pile, the pith bottom and the layer around 10 cm and besides it towards the top. This part of the pile is called fireplace. Later, in the cooking phase, the temperature at this spot reaches 280°C or even more and the charcoal from this part of the pile is called "prezgano oglje" (overburnt charcoal,) or "strženina". This charcoal is rather thin and of low quality. Charcoal burners call it "charcoal groats". The pile is lit from the top so that a few splinters are thrown to the bottom and live coal over them. This is usually done by a woman who climbs a ladder to the top of the pile with a bucket of live coal. She throws a shovel or two of live coal into the pile. When the fire bursts out and white smoke starts coming out of the open pith, the pile is lit. The charcoal burner's work is now to lift the fire from the bottom of the fireplace to the top of the pile, so that carbonization starts in the head. For this purpose charcoal burners fill up the pith with thin wood, from 8 to 10 cm long, called "budlovci". It's wood of beech and pine branches, hazelwood, and they also add "strženino". This is the way to warm the pile and to lift the fire up the pith. Every two to three hours they add two baskets of "budlovci" into the pith, as long as the pith is filled up tot the top with their fire-sticks. The charcoal burner finds it out, poking with a stick, which he later uses also to make the so called smoke holes. When the pile is warming, they either close the pith or not. It is interesting also, that the do not make the so called air holes, holes at the foot of the pile, which is why the fire-place does not burn but smolder. The temperature inside the pile is growing and the logs are drying. Steam, smoke and gasses gather in the inside of the cover in the head and the soil starts getting wet. When the pile is hot enough and the head becomes soft, they close the pith with a board and soil. This way, the pile is prepared for the carbonization process when wood neither burns nor smolders. This phase of lighting the pile lasts from 1 to 3 days, depending on humidity and thickness of wood and on the size of the pile. After three days, the charcoal burner opens the pile at the lowest part of the pile site, at its foot, only as much as to allow distillates to flow out.



### ***2.5.3 Carbonization process and supervision***

At the beginning, up in the head and all the way down to the foot of the pile, the charcoal burner controls carbonization by making holes to let the smoke out, called smoke openings. He makes them with a special hole-making pole in the soil coat and he tries to hit between two logs for better effect. For this purpose he usually uses a dead pine tree, with a diameter of 3 to 5 cm which charcoal burners call "bukavnk". Carbonization starts when charcoal burner hears cracking under his feet when he walks across the head of the pile. This is the time to make the first smoke openings between the shoulder and the head.

From the top of the pile carbonization spreads towards the bottom. Smoke openings are from 15 to 30 cm apart, depending on the quantity and sort of wood. Smoke openings have to be located at about the same height and more frequent towards the bottom. At the beginning, carbonization runs slowly and carefully. Charcoal burners know that by the color of smoke, which in the beginning is white as it contains a lot of water steam. Later it turns gray which means the carbonization process has begun. A very thick, brownish yellow smoke shows that the process is in its most intense phase while a thin blue smoke shows the process is coming to its end. Finally smoke becomes light or transparent which means that carbonization in that part is finished. The charcoal burner now closes the smoke openings and moves them one row lower. The distance between rows is half of the height of the layer, so that gasses flow out by the shortest way and do not come into contact with neither charcoal, nor wood. If wood saturates with these gasses, carbonization is slower and the quality of charcoal is lower. In this phase, carbonization can no longer be stopped.

When the process passes from one layer to another, the charcoal burner sees that by the deformation of the pile as it sinks down. Usually, the pile does not carbonize evenly, yet cooking in the centre, by the pith runs about 40 to 60 cm lower than in other parts. We can say that carbonization spreads in the form of a cone turned upside down. Besides that, carbonization runs in the fireplace from the top towards the bottom of the pith, therefore this charcoal is overburnt. It often happens that in certain parts of the pile wood carbonizes unevenly or too fast. A depression appears at such a place. The charcoal burner has to pay attention to this and he usually closes smoke openings at this spot. At the opposite site he makes air openings under the smoke openings so that carbonization levels up to the same height. Before that he has to open the pile at the depressed spot, fill it up with wood and cover it tightly again with soil. Charcoal burners call this "bokanje". For this, remnants from former piles or dry logs are used. At this spot, the quality of charcoal is lower. Too fast carbonization is usually caused by sudden winds, irregular pile site, badly stacked logs or weather conditions, like rain storms and severe cold. It also happens that at the carbonization part, soil becomes very hot and therefore turns powdery. Soil pours into the cooked charcoal and holes appear in the coat. Charcoal burners close these holes tightly as fast as possible to



prevent draught which makes charcoal to catch fire. The soil can also pour onto the logs at the foot of the pile, so that later non-carbonized fire-sticks appear, which charcoal burners call "kurabini". In case of too few smoke openings or in case these are situated too low, again, on the inside of the head, gasses and water steam can accumulate. The pressure they make can lift the soil coat, which the charcoal burner has to replace as soon as possible, as in such a case the temperature in the pile rises and the charcoal overburns. An experienced charcoal burner can foresee such an event and can prevent the so called puffing of the pile by adding the number of smoke openings at the right spots. Cooking is faster and faster towards the foot of the pile therefore the charcoal burner needs a lot of experience. He makes the last smoke openings in the middle between the first layer and the floor. When transparent smoke starts coming out of them, the pile is cooked. Then the charcoal burner closes all the openings and leaves the pile to cool down. The carbonization process, from lighting to unloading the pile, takes most of the charcoal burner's time, as with a middle sized charcoal pile carbonization takes from two to three weeks.

## **2.6 Unloading of the pile**

After cooking the pile is left at least two days to cool down. For this purpose, charcoal burners clean the pile as soon as carbonization is finished. With a rake they carefully remove the layer of soil stripes, clean it, cool it down and quickly put it back. They move around and around the pile. At the end they smooth the soil. The aim is to suffocate any glow in the pile and to cool down the charcoal to prevent it from catching fire at the time of unloading. Unloading or "štoranje" is done by at least three charcoal burners. They start at the side, in stripes of 3 to 4 m, at the foot, and 1m deep towards the pith. First they remove the soil with a rake then the charcoal burner digs the charcoal out with a hoe or a hook, called "šturakl", and piles it up at the side. The other charcoal burner cleans it well and takes it to the side of the charcoal pile site with charcoal-burning-fork. The third charcoal burner stands ready to extinguish the glowing charcoal to prevent burning. He does this with water even though this makes charcoal to get soaked with moisture and the quality is lower. Therefore charcoal burner must take more time for "štoranje" to suffocate the glowing charcoal with soil. When charcoal burners finish work at this part of the pile, they cover the stripe again with soil. Thus charcoal is covered all the time and protected from rain which might ruin it in case of bad weather. After that they move around and around the pile. At the very end they undo the pile around the fire-place, they separate the "strženina" from the rest of the charcoal, situated all around the edge of the charcoal pile site. It remains here as long as it cools down. They usually put the cold charcoal into paper bags (15 to 17 kilos) and store it in a closed, dry place. Most often this place is under a hay-rack. Upon the wish of a customer they can bag charcoal into smaller bags, 3 or 10 kilos.



## **2.7 Time consumption and organization of work**

For the preparation of wood, transportation to the charcoal pile site, loading, cooking and unloading of a middle sized pile charcoal burner needs, in average, about 43 days. For bigger piles, which give about 8 tons of charcoal, he needs about 47 days. He mostly does the work alone, together with his family. Charcoal burners only help one another in the phase of blackening. Three to four of them line up around the pile and start putting up the soil. Work is thus faster and easier and the quality of deposition is better which makes fewer problems in the cooking phase.

Unloading of the pile is also a team work. In most cases, three to four charcoal burners form the team and they unload an average-sized charcoal pile in a day. If the pile is of 8 tons or bigger, they need two days. The charcoal cools down in a day or over night and is ready for bagging the next day. Bagging charcoal into 3 kilo bags they prepare about 2 tons of charcoal a day. Bagging into usual size bags (15 to 17 kilos) takes one day. In case of bad weather they load the charcoal on a tractor trailer and continue bagging under shelter. Preparation for the sale thus takes, for a pile of 6 tons, from 3 to 4 days and for a pile of 8 tons from 5 to 6 days.

## **3. IMPORTANCE OF CHARCOAL PRODUCTION**

### **3.1 For the environment**

A big share of forest stands is in its younger development stages, far bigger from what our models are showing. With adequate measures, especially cutting in polewood forests we can promote, in a rather short time, a transition of younger forests to mature development stages. Great quantities of thinner, low quality wood, which can be used for charcoal piles (added value) represent quantities which can help solving the problem of thinning in younger stands and marketing of timber assortments of lower value.

For charcoal burning we can benefit from wood from grassland in coalescence which slows down the coalescence of farming land and thus helps to preserve characteristics of the cultural landscape.

### **3.2 For the owner**

For the charcoal burner charcoal production has a multiple meaning which can be divided into a sociological and financial part.

Our charcoal burner is not only the one who preserves the cultural landscape, reduces coalescence of grassland and performs tending in young forests, he is becoming a teacher, explorer and a guide. He can feel he is able to do something special and valuable.



Besides charcoal, he can sell natural and cultural landscape, the charcoal burner's hut, his own products, from cider to bread.

Socializing he gives himself and his surroundings a lift.

## **4. COSTS OF CHARCOAL PRODUCTION ACCORDING TO THE TRADITIONAL METHOD AND WAYS AND FORMS OF SALE**

### **4.1 Individual costs according to method of charcoal burning**

The costs do not only capture the costs of wood, namely, we believe that charcoal burning is done only by forest owners who acquire wood from their own forests.

The costs are oriented to a middle-sized charcoal pile with about 50 stacked cubic meters of logs.

Prices of tractor and cutting wages per hour are from 2003, used by Farmland and Forest Fund of the Republic of Slovenia. Other daily wages are according to Ministry of Agriculture, Forestry and Food.

#### **4.1.1 Preparation of charcoal pile site (constantly in use) 1€=240 SIT**

4 hours \* 2000,00 SIT = 8 000,00 SIT)

#### **4.1.2 Preparation of wood**

Cutting 50 stacked cubic meters : 56 hours \* 3345.25 SIT = 187 334,00 SIT

Cutting, skidding and transportation of logs to the charcoal pile site : 48 hours \* 6070,00 SIT = 291 360,00 SIT

#### **4.1.3 Charcoal pile loading**

32 hours \* 2000,00 SIT = 64 000,00 SIT

#### **4.1.4 Preparation of the pile for blackening**

Preparation of "grasa", transportation to the pile site and coating the pile with "grasa"

24 hours \* 2000,00 SIT = 48 000,00 SIT

#### **4.1.5 Blackening of the pile**

24 hours \* 2000,00 SIT = 48 000,00 SIT

#### **4.1.6 Cooking or carbonization**

12 days \* 8 hours = 96 hours \* 2000,00 SIT = 192 000,00 SIT

#### **4.1.7 Unloading the pile**

5 days \* 8 ur = 40 ur \* 2000,00 SIT = 80 000,00 SIT

#### **4.1.8 Bagging**

32 hours \* 2000,00 SIT = 64 000,00 SIT



***4.1.9 Total costs for loading of the pile with 50 stacked cubic meters of charcoal burning logs are:***

982 694,00 SIT

**4.2 Balance**

Income from charcoal (50 stacked cubic meters of logs = 5 000 kg of charcoal, \* 80,00 SIT) = 400 000,00 SIT

Costs of preparation of charcoal for transportation (without the price of wood) are: 982 694,00 SIT

Negative balance in the amount of 582 694,00 SIT is stated, which means that the sales price of charcoal covers only 41 percent of costs.



<b>COSTS</b>	<b>BAGGED (3 KG BAGS), in SIT (1€=240SIT)</b>
Purchase price of charcoal 1 kg	80,00
Labeled bag	50,00
Transportation bag	10,12
Transportation to the warehouse	4,11
Delivery	6,30
Storage	1,11
Costs for sales	4,00
<b>Total costs until storage</b>	<b>155,64</b>

#### **4.4 Establishment of a development centre**

Sales costs undoubtedly increase a lot before the product – a three-kilo bag of charcoal – comes to the shelves. Therefore other forms of sales have to be found. One of them can be, for example, establishment of a Rural development centre.

In the last few years, establishment of a Rural development centre has proved to be one of the possible solutions of a rather uneasy situation of the rural population. A number of studies and programs CRPOV treat job creation of underemployed rural inhabitants as a priority. They need to be given complete help in solving their existential problems. Therefore, the rural development centre project is designed in way to lead all target groups, at which it aims, from introductory presentations of the project contents and categories of services, offered by the centre (animation and motivation of individuals for active participation in the development centre) to specific educational programs to attain adequate business certificates (training of participants or social-economic phase of the project) to step-by-step introduction of a business activity and transition into economically independent business, which means creation of new jobs.

One of the branches, gaining its importance recently, is a traditional form of charcoal production. Advantage of such charcoal is its high energy value but users are not aware of its quality. Insufficient knowledge of buyers is the reason for smaller demand for this product. With a better promotion, education of buyers and marketing under a uniform trade mark, sales of the home-made charcoal could be augmented and new employment possibilities would open. The area of Charcoal burning land and the area of Sveti Mohor in the Selška valley represent a kind of a charcoal burning oasis in the middle of Europe, as it represents the largest area, with respect to its surface and number of burning charcoal piles, in Europe. Charcoal burning and its associating activities form also part of the tourist offer, for example Charcoal burning land (charcoal burning path, spending a night with a charcoal burner, charcoal burning school).

The new, independent centre will take care of the motivation, education for new specific knowledge, systematic education for enterprise, development and leadership of business functions and organization of a long-term support in the environment (development of necessary services and service activities). The main target, however, is integration of small producers for a joint appearance on the market. All members of the development centre would join in the last link of the chain that is bagging and marketing of the products under a common trade mark. Establishing a uniform marketing system, sale at home, at the existing



tourist information offices and eventual newly raised sales points in certain settlements, all members will have a guaranteed buyout and promotion of their products.

In the long term, increment of entrepreneurial activities in the rural areas means making new jobs and making additional income which indirectly means saving settlements in demographically endangered areas.

## **5. CHARCOAL BURNING LAND**

### **5.1 Presentation of the Charcoal-burning land**

The charcoal-burning land, with its centre in Dole pri Litiji lays in the municipalities Litija and Trebnje, in the local communities Dole pri Litiji and Šentrupert. Locally speaking, we can place the area into central Slovenia, between Posavsko hribovje and Dolenjsko gričevje, south of the Sava river, bordered by the Sopot river in the east, Jatna in the west while in the south it reaches all the way to Dolenjsko gričevje by Šentrupert. It is located quite far from bigger towns and municipality centres.

Access to the Charcoal-burning land is possible from several directions by good, well kept roads; from Litija over Gabrovka or over Velika Preska, from Radeče down the valley of Sopote and from Dolenjske through Mirna and Tihaboj or over Šentrupert.

### **5.2. The structure and social conditions of charcoal burners**

Present day charcoal burners have learnt charcoal burning from their parents, in 64% of cases. The rest of them have learnt the technique from relatives and neighbors and some of them from professional charcoal burners whom they had assisted when they had been burning charcoal in the vicinity. The last one, of course, was the learning method of burners who are a little older. Every charcoal burner believes it is better to load thin wood or low quality logs into a charcoal pile rather than leaving it rot in the forest or by the grassland. For many of them, charcoal burning means an additional source of income at the farm.

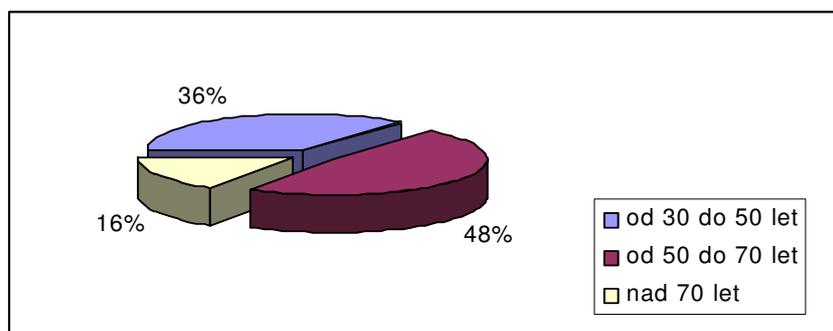
As many as 96% of charcoal burners are pure farmers or retired at farms - 24% of all the inquired. 20% of charcoal burners reach half of the income at the farm from charcoal burning and in 4% of cases charcoal burning represents the main activity. In 36% charcoal burning represents less than half and more than one tenth of the income of the farm. For 12% charcoal burning represents up to one tenth of the income of their estate. Besides charcoal burning, farmers are mostly engaged in stock-farming and milk production and in a smaller extent also in bee-keeping and horse-breeding. The share of income from trade with other forest assortments is not small either.

There is a habit at Dole that the entire family works at charcoal burning. Many a woman knows how to load the pile and cook it and she can take place of the charcoal burner in case



he has work elsewhere. In as many as 60% of charcoal burning families children know the technique of loading and cooking as they have been helping their parents since very young.

Today only 40% of charcoal burners have their charcoal pile sites in the forest and the rest of them in the agricultural community, in the direct vicinity of their homes. Average age of the charcoal burners, when they started with charcoal burning, was 18 years.



Age structure of charcoal burners in the Charcoal-burning land

In the younger group of charcoal burners, as many as 78% of the inquired burn charcoal regularly and the rest of them only temporarily. In the second group, from age 50 to 70, 58% burn charcoal every year and 25% only temporarily. 17% of the inquired from this group no longer burn charcoal. Over the age of 70 they usually no longer burn but there are some who still load one pile every year.

### 5.3 Swot analysis of the Charcoal-burning land

#### ADVANTAGES:

- **Cultural heritage** (charcoal burning, mills, saw-mills, black kitchen)
  - ENTRY FACTOR: active bearers of the activity
  - WINNING FACTOR: story with a complete offer (for example: Smolajev Rudl, Nefka)
- **Clean and unspoiled nature**
  - ENTRY FACTOR: clean and unspoiled nature
  - WINNING FACTOR: meadow plants (Arnica, Thore's Buttercup,...), a well organized flower path, a meadow plants guide
- **Processed own-produce**
  - ENTRY FACTOR: registration, raw materials
  - WINNING FACTOR: quality, flavor of domesticity (find a special dish)

- **Natural potentials (waterfall, natural window,...)**

- ENTRY FACTOR: curiosities of the nature
- WINNING FACTOR: good guide, legends, tales

Advantages are those characteristics of the Charcoal-burning land which make it possible to be competitive on the market. We divide them into advantages as **entry factor** and advantages as **winning factor** to win business or customers.

Entry factors mean those advantages of the Charcoal-burning land which make it possible to perform a certain activity or business, while winning factors represent those advantages which make a customer to decide for the offer of the Charcoal-burning land and not something else. In that we have to divide between actual and desired advantages or factors. Actual factors are those which the Charcoal-burning land already has while desired ones are those it wishes to have and for which it has to work additionally to make them reach their value on the market. If we look at concrete advantages of the Charcoal-burning land we can see substantial differences between actual and desired advantages. With respect to the cultural heritage the winning factor of the story with a complete offer is still missing but with a detailed look at all the abilities and knowledge of the local people it would be easier to get the basic bearer of the story.

The entry factor of the clean and unspoiled environment for now still exists but local inhabitants are afraid of excessive pollution therefore to be able to utilize these advantages, local population has to be educated to know how to protect the environment and offered alternatives for preservation of clean water. The winning factor of meadow plants is realistic as special plants which could be used exist. But an organized guided medicinal herb or flower path is still a desire which could become a reality, though, as there are realistic possibilities for that.

There are raw materials for processed own produce but there are often obstacles when it comes to the registration of the business which requires a lot of good will, help and perseverance. Farmers usually give up before the end that's why a lot of work will have to be done at the entry factor to educate and help the farmers. They can find support in RCL and the Rural Development Centre. The winning factor is still in a fog, namely, a special dish has to be found or made anew. It has to reflect either tradition and specialty or extraordinary quality. In case of advantages of natural potentials entry factors are a reality while the winning factor, guides and special stories will require additional work.

#### DISADVANTAGES:

- **Low educational level**
- Solution possible in a short term

SUGGESTION FOR A SOLUTION: better education of local people (workshops, lectures) about social capital importance of cooperation and development, education on informal levels regarding entrepreneurial knowledge...

- **Demographic endangering**
- Solution possible in a long term

SUGGESTION FOR A SOLUTION: animation of the local community to stimulate more people to stay there; help for young families

- **No accommodation facilities**



- Solution possible in a short term

SUGGESTION FOR A SOLUTION: applications to tenders for financing of tourist farms; to show potential accommodation holders that they can invest into it because they have an encouraging background, help of others,...

- **Non-finished infrastructure**
- Solution possible in a long term

SUGGESTION FOR A SOLUTION: lobbying on a municipality level, enclosed program of a development strategy

- **Single farm owners**
- Solution possible in a long term

SUGGESTION FOR A SOLUTION: education of young farmers, stress on basic hygiene, tidiness

- **Ruin of farms**

- Solution possible in a long term

SUGGESTION FOR A SOLUTION: educate farmers that intense farming is not a way towards success in such an environment and offer them an alternative in supplementary activities

### **Too much bureaucracy in procedures**

- no influence

### **OPPORTUNITIES:**

- **Development of tourist charcoal-burning farms**

ARGUMENTS: A still live tradition in the village offers the charcoal burner an opportunity to develop a complete offer which presents the life and work of a charcoal burner. Some charcoal burners have, besides the charcoal piles themselves, the capacities to offer accommodation and food and to enable tourists to participate in loading the pile. Charcoal burners have to be stimulated to put their capacities in order and together with other services make a package of a complete offer. Farmers who are not engaged in charcoal burning can participate as well

- **Alternatives for small and middle-scale farmers in supplementary activities**

ARGUMENTS: it is difficult for small and middle-scale farmers in this area (above 500 m above sea level) to be engaged in intense farming. Their opportunities are hidden in supplementary activities like charcoal burning, dry fruit production, farming mechanization servicing, bakery, medicinal herbs, souvenirs, home made wool products, meat processing, milk production, smoking of meat.

- **Recreation - adrenaline offer**

ARGUMENTS: Dole has terrains adequate for horse-riding, hiking and bike tours, as well as skiing which all represent a great opportunity for sports enthusiasts. The adrenaline part, however could be improved, where the given advantages could be used (waterfall, ski-slope, caves).

- **Charcoal burning as a commercial activity**

ARGUMENTS: Even though charcoal burning is a traditional craft, interesting for tourists and cultural heritage admirers with a good business strategy it could be developed into a



successful commercial activity in which charcoal burners from the Dole area would participate and sell their charcoal under one, holding trademark.

#### DANGERS

- **Pollution of nature (especially water)**

SUGGESTIONS FOR IMPROVEMENT: Educate farmers that their way of liquid-manure and waste disposal pollutes water and harms their surroundings and show them alternatives to improve things.

- **Lack of interest of the local people**

SUGGESTIONS FOR IMPROVEMENT: Stimulate the need for a higher quality life style and show advantages of cooperation and common initiative of the inhabitants.

- **Too demanding business registration procedures for farmers**

SUGGESTIONS FOR IMPROVEMENT: Educate farmers and offer help from Rural Development Centre.

- **Increased migration of people**

SUGGESTIONS FOR IMPROVEMENT: Revitalize the community and offer the inhabitants possibilities for supplementary activities; animate young people to get involved in the life of the community.

The SWOT analysis has shown:

that the biggest traps are **lack of interest of the inhabitants** and **increased migration**. Both of them have the same common elements, low educational structure, demographic endangering and ruin of farms.

We can directly connect this to the table comparing advantages and opportunities which shows that the key opportunities, where the story has to be continued, are **supplementary activities** and **development of tourist charcoal-burning farms with a complete offer**. The common lines of both opportunities are cultural heritage, clean and unspoiled nature and processed home-made products.

We can say that supplementary activities and tourist charcoal-burning farms are key factors for the development of the Charcoal-burning land. Charcoal burning is only one of the supplementary activities, which can link the whole story, but can by no means be the main bearer of the rebirth of life in Dole pri Litiji.

## 5.4 Segmentation of customers and users

For a successful marketing strategy segmentation of customers has to be done (sales channels, users).

The kea and **desired segments**, which the Charcoal-burning land needs **today**, are the segments of **the Simple and the Acceptable**.

These mostly come in groups, they are organized and guidable. As a group they look for social events which offer fun, good food and drink. Everything must be wrapped up in a story (for example – loading the biggest charcoal pile), however it has to be done in a way to satisfy the crowd which is led by a herd impulse. Such needs Dole can satisfy today but with a more complete offer they can win more tourists.

In **the future** they can provide for segments of **the Golden, the Reliable and the Nostalgic**, who base on the concept of quality. These will have to be offered the experience of the



country-side (emotions of tradition and natural beauty). They will have to build on peace, tidiness, smell of the country-side, tasteful and high-quality food. This segment needs a personal, intimate attitude as we speak about individuals or small groups who know exactly what they want for themselves and are prepared to pay for a good offer.

### 5.5 Segmentation of sales channels

Segmentation of the sales channels has brought us to 5 different segments which were defined on the basis of the criteria for a desired sales channel. The key criterion for the segmentation was recognizance of the sales channel in the area of marketing of the country-side. This criterion divided the segments into those for which doing business with the country-side represents a primary activity and those for which this is just a side activity.

The most desired sales channel segment for the Charcoal-burning land is "**Way to success**", distinguished by the recognizance in marketing of the country-side, acquaintance with the offer of the Charcoal-burning land and constant cooperation. The segment called **Potential** is also suitable. Even though it is not recognizable in the area of country-side marketing it is acquainted with the offer of the Charcoal-burning land or its influence in a wider area.

Segments "**Macadam**" and "**Filler**" represent sales channels which we take into account only when there's no other business or when the capacities are empty. Macadam is a segment which is, in spite of dealing with the country-side and its international orientation, rather difficult as it does not know the offer and it requires much more effort.

Filler is what cooperates periodically and / or is not acquainted with the offer. Our interest for such a segment of customers only makes sense if in by no means we can fill our business or tourist capacities with more desired segments. The segment of **the undesired** includes all those customers with low solvency and bad cooperation with influence on a local level only. As such it is not interesting for the Charcoal-burning land.

### 5.6 Charcoal burning as a tourist attraction

The future of charcoal burning depends in the first place on the possibility of selling the charcoal. The place can be recognizable by charcoal piles which give uniqueness in recognizance of the place as the charcoal-burning land. This specialty, difference, can serve as a good reason to invite visitors into this area. To spend a night with a charcoal burner or sleep in a charcoal-burner's hut is undoubtedly an adventure. But for that, of course, a visitor, an explorer or someone who is looking for something special, has to be kept in the area for a longer period.

In the Charcoal-burning land charcoal piles in different stages can be found throughout the year in a rather small area. This gives us the chance to link different places into a Charcoal burning thematic path, with the addition of other specific elements of the area (rich natural and cultural heritage). We can enrich the area with an occasional museum and we can already speak about the Charcoal-burning school. Thus we can win a certificate for the charcoal burner which would be a prerequisite for registration of the supplementary activity at the farm. All this gives possibility of opening different studying spheres, different workshops, natural-science days, ...



Drawing and creating with charcoal could attract artists of different profiles, who bring richness to the spiritual life of the place.

We must not forget charcoal burning days, a hike,... which join the local people in joint actions, joint appearance on the market under on charcoal burning trade mark.

We can link charcoal burning with smithies, smithies with ... to get different close circles of work and ideas.

## 6. FINAL STATEMENTS

Charcoal burning enables preservation of the identity or mental image of an area.

Other bearers of the country-side get jobs, too.

In the continuation of the project a marketing strategy for both key segments of consumers and for adequate sales channels, has to be determined. It includes:

- definition of the appropriate sales mix (services and products) according to behavior and purchasing pattern (segments);
- searching information about clients, belonging to a particular segment;
- development strategy regarding relations with desired segments of sales channels (motivation, communication, education of sales channels for education of the consumer);
- transition strategy for supplying the segments from today to tomorrow (transition based on key capacities);
- communication strategy outwards and inwards with defined segments.

We have also stated that tradition is the main factor in the preservation of charcoal burning. It is this tradition that has to be built up by state measures so that charcoal burning will become interesting from the economic point of view. And that is when we will undoubtedly witness an increase of tending works done in the forest and a reduction of coalescence of farm lands.

Today more than 50 charcoal burners burn charcoal in Slovenia. They should be joined up in an association and this would make it easier for them to appear on the market.

Literature and sources:

- Prah Jože in Miloš Brinovec: Dole pri Litiji, kraj, kjer oglarstvo živi. Dole pri Litiji, 2002.
- Prah Jože: Dežela oglarjev, razvojna možnost (ideje). Dole pri Litiji, 2003
- ZOP Management Consulting: Razvojni program CRPOV za območje KS Dole pri Litiji. Ljubljana, 2002
- Vibacom d.o.o.: Oglarska dežela 2004 – 2005

