

# Opportunities of Raw Hide Using as a Sustainable Material in Latvia

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**Abstract.** The aim of this work is to interpret the situation with the use of sustainable resources by taking animal rawhide industrial processing as an example. The importance of rawhide material effectiveness for sustainable development in leather manufacturing in the territory of Latvia is described.

The paper plays an important role in identification and study of Latvian renewable resources. The main objective of the paper is to inform the society about the availability of leather resources. Methods for developments of national economy have been assessed which have historically proved their existence and comply with sustainable development of leather manufacturing.

**Key words:** animal skin, tanning, sustainability.

## INTRODUCTION

The article addresses significant problems of using rapidly renewable resources in Latvia and provides adequate solutions for them.

As a result of the important leather industry and slaughter houses research, significant components for using renewable raw hide resources have crystallized to improve the economic base of the Latvia's economy, without causing any damage to the environment.

In this case, it is possible to create useful design objects with biodegradable properties, which are very important for the ecosystem maintenance

Scientific achievements and the industrial boom have contributed to production of synthetic materials, which proportion currently accounts for 80% of the entire range of the materials. [1]

Natural resources are a part of nature and exist independently of the man-made environment. The sustainable yield of natural capital is the ecological yield that can be extracted without reducing the base of the capital. This yield usually varies over time with the needs of the ecosystem and is an index of production sustainability.

A natural resource is a renewable resource, when it is replaced by natural processes at a rate comparable or exceeding its rate of consumption by humans. Raw hide resources as products of meat industry can be an example. Man has learned to process raw hide and created a separate industry – raw hide tanning – to get a qualitative leather material which is widely used in furniture, clothing, footwear, haberdashery, etc.

Leather tanning industry is strategically important for the advancement of Latvian national economy. As a proof of this – EU tanning manufacturers are largely depending on available raw materials, which could be easily supplied from Latvia's rapidly renewable resources.

Today Latvia is not engaged in leather producing, which was popular in 1940s and up to 1990s. As a result, a large amount of raw hide materials have been destroyed or sold to foreign dealers.

Currently only one hide handling manufacture – the joint-stock company “Ritales” is functioning in Latvia. This leather manufacture handles hide and exports a semi-finished product – wet blue or raw hide to other European countries.

One of the problems of leather industry is raw hide storage. This process is not sustainable with regard to using materials and causes harm to nature. Raw hides are stored in salt, which provides long term preservation, is washed out after this process and not used again. Another problem is that, as there are no other possibilities of storing raw hide, foreign dealers purchase this raw material from Latvian slaughter houses and Latvia is left without this raw material. The problem is urgent because it is necessary to perform extensive research in finding raw hide storing possibilities which are less harmful to nature (because raw hide storing and processing cause nature pollution) and contribute to economical development in Latvia in this field.

Sustainability is the capacity to endure. In ecology, the word describes how biological systems remain diverse and productive over time. The urgency of this subject is further strengthened by the fact that food (meat) industry will exist as long people eat meat and, as a result, raw hide materials will also appear.

## MATERIAL SUSTAINABILITY

The concept of sustainability has become a recent trend. Many people talk about the importance of the sustainable concept and many companies begin to provide sustainable products and services. However, many people neither really know, nor understand the actual importance of sustainability.

Sustainability can be defined as a state or process that can be maintained infinitely. This definition can be applied to any area, including ecosystems, people, economy, environment, energy, lifestyle, business, industry and many other aspects you can think of. [2]

The 21<sup>st</sup> century can be characterized by substantial changes in all directions of public life – economy, policy, culture, technology and ecology. Processes of globalization cause these changes. Humans have reached maximum heights in application of synthetic materials. And now it is the time to return back – closer to nature. Today there is a growing interest to natural materials, especially to those, which ecologically impact on human health and environment. This is the right time for the society to assess the value of natural

materials and their significance for improvement of the quality of life.

The rapid modern lifestyle needs connection with nature, because human thinking changes with technological progress. Not only material values influence human life, but also mental values have the increasing significance [3].

Many falsely say that sustainability is only related to the environment. In fact, sustainability covers a wider area. There are three main aspects of sustainability:

1. Environment: focus on preserving the earth, nature and the environment which will support all living beings;
2. Social aspect: focus on welfare of mankind;
3. Economy: focus on economic growth.

All of these three aspects include material production or manufacturing. Industry is generally considered as a major threat to the environment.

Materials can be characterised by different aspects of sustainability – harmlessness in output, production, manufacturing, using, recycling and even disposal (Fig. 1). Actually, materials sustainability is formed in all material life cycle.

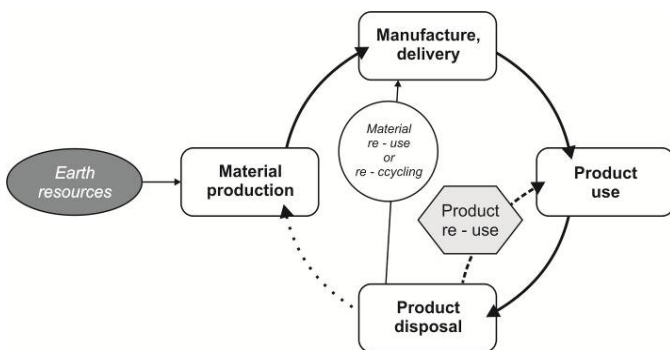


Fig. 1. Material life cycle [4]

As it can be seen from Fig.1, a material is sustainable when a product made from this material can be reused, or the material can be reused or recycled.

Sustainability in leather industry is associated with cattle, it is because of the fact that people will eat meat and, as a result, leather material will be sustainable until people keep animals. Leather material is a natural material and natural resources (economically referred to as land or raw materials) occur naturally within environments that exist relatively undisturbed by mankind, in a natural form. A natural resource is often characterised by amounts of biodiversity existent in various ecosystems. Natural resources are derived from the environment. This is currently restricted to the environment of the Earth, yet the theoretical possibility remains of extracting them from outside the planet, such as the asteroid belt. Many of them are essential for our survival, while others are used for satisfying our needs. Natural resources may be further classified in different ways. [5]

Technological development has created opportunities for getting more services, using a smaller amount of materials. The average production system attached to the material amount is growing steadily. At the same time, new and more

effective manufacturing methods, which make many materials cheaper, have been recognised and identified. As an example – imitation leather is the most sold leather variety. It is easier to be produced and is cheaper, but it is not natural.

Intensive use of materials shows the general upward trend since the beginning of industrialisation. However, in the future, this process will stabilise or even decline. It is also applicable to some "old" materials, such as iron, cement and lead manufacturing.

To be able to achieve the required radical reduction of long-term environmental impact and resource depletion, there is definitely a need for tighter control over society required material streams.

Natural resources and materials are now very different both in quantitative and qualitative terms. Sustainability requirement is to adapt to natural cycles for the society caused material flows. Nature has fixed resource generation capacity for substances produced and used by the society. Nature has also a limited capacity to assimilate the substance, which society turns back to it. [6] Moreover, trying to stabilise the nature capacity, its biological diversity is often impacted too much. Therefore, materials useful for utilization are considered to be the ones, which in varying degrees transform into different products and which can be used in different industries of national economy.

As an example, leather or raw hide materials will not drain away, because they are semi-finished products of meat industry, and that is why they form a sustainable material in the manufacturing sector and are an additional source of income for the national economy.

Regrettably, leather is not produced in Latvia. Cattle raw hides are tanned and exported to other EU countries (mostly to Italy and Poland) as semi-products (like wet blue or raw hides). There tanned raw hides (called wet blue) are processed, a leather material is produced and sent back to Latvia (and other countries) as the leather production material. This is not the sustainable thinking about the national economy development.

Leather tanning is not a healthy manufacturing either for people or for nature. That is why the main sustainable ideas in Latvia have to deal with nature pollution problems caused by chemicals and hide storing in leather manufacture.

By making products more usable, for example, by improving their quality, the same quantity of material will last longer. [7]

Another strategy is related to reuse of the material. Several strategies for reducing the material flow in industrial processes can be used. Here is an example from leather manufacturing. Tanning is the process where chrome salt is used. Earlier this chemical cocktail was discharged to sewage. Later refinement equipment started to be installed near the manufactories. Now, at the end of the tanning process, chrome salts are transformed into small balls and then are collected and recycled at chemistry plants.

Our health and wellness in many ways depends on the nature opportunities to focus our used and dissipated materials, as well as restructure them again into resources. The

society depends on the long-term functioning of the ecosystem.

Progress in development of materials affects progress in development of design. Innovative materials and technologies form a source of inspiration for product designers, offering new visual, tactile, spatial and other solutions for the product design.

Natural materials are more expensive in economical terms, but their lifetime is much longer and they have a positive effect on human health.

It is explainable by the fact that people value a chance to be closer to nature, which is not possible nowadays due to urbanization. In this process, the ecological trends affect also the sustainable design in Latvia, marking its specific features.

#### LEATHER AS A SUSTAINABLE MATERIAL

Hide is one of the oldest raw materials, which have been used throughout the times. People have been using leather since the Paleolithic period and up to nowadays for different purposes.

Leather is a natural fabric (Fig. 2). It has high tensile strength and is exceptionally tough and resilient, yet it is flexible and – as suede – is soft to touch. It is prepared by tanning of animal hide. Tanning is a smelly process, where a hide is soaked in solutions of tannins for weeks or months, making it pliable and resistant to decay. Leather is used for belts, gaskets, shoes, jackets, handbags, linings and coverings.



Fig.2. Leather icon [8]

People expect emotional satisfaction, as well as functionality, in everything they consume. Design objects can be made from different kinds of materials, showing in this object something more than its external shape. Designers attempt to combine technical with esthetical, conflating suitability with emotional desire.

Materials in this process are subaltern, but they are not perceived as independent entities. Such factors of communicational space as functional layout, design, colours, illumination and also space microclimate are influencing the mutual interrelation of people. For this reason, intellectual values are gradually occupying everyday life of man, including the organization and aesthetics of external spatial environment.

Leather, as a natural resource, is a renewable resource, as it is obtained by natural processes and even ready used leather may be restored. Leather is a very durable and qualitative material. It has a large range of assortment, high abrasion resistance and long lifetime. Leather is a natural and ecological material, which is easy to clean.

Leather industry is the oldest in Latvia. The very first manufactories of raw hide handling appeared at the end of the 18<sup>th</sup> century, gradually competing with different handicrafts of raw hide processing which had been established during the Middle Ages. At present, leather manufacturing and processing have been practically stopped in Latvia, only one hide handling manufacture – the joint stock company Ritalas (located in Jelgava), with approximately 50 employees, is currently functioning. The average age of the employees is between 40 and 60. Many of them got the hide handling specialty in Russia (due to the lack of professionals which could lecture knowledge about hide handling in Latvia). [9]

Ritalas hide handling manufacture is dealing with Latvia's livestock (mostly cattle (cows and oxen) are used) from definite slaughter houses. The joint stock company Ritalas exports 95% of combined nomenclature group products – raw hides and skins (other than furskins) and leather. 5 % of all products remain in Latvia as leather for other goods. [10]

Raw hide and skins are widely used by the tanning industry worldwide as a by-product of meat and milk industry for further processing. The situation in the countries where leather industry is not developing or has been stopped is similar to that in Latvia, i.e. the industry by-products, such as raw hide and skin, are just thrown away or destroyed.

Every year thousands of cattle (could be 380 000 units in total) are slaughtered in Latvia, the total volume being 200 tons of skin per month. The amount of raw hide and skin processed monthly by Ritalas is 100 t, obtaining about 14 300 square meters of semi-finished manufacture for exporting to other European countries. [9] It would be more cost-effective, if Ritalas could process 100 t more of raw hide materials and produce leather.

Leather industry branch is impeded essentially by the great amount of illicit slaughter houses, the EU requirements, dealers who hide raw, lack of professionals, small manufacture with department of leather handling studies and raw hide storing possibilities (Fig. 3).

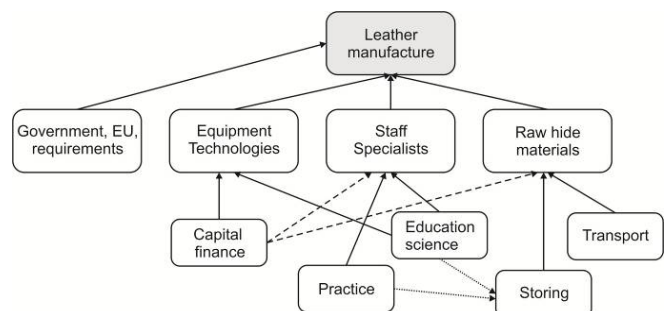


Fig. 3. Leather manufactory basic resources and constraints

As it can be seen from Fig.3, leather industry in Latvia depends on many factors and resources and is impeded by many constraints. For sustainable development of leather industry, it is necessary to find out the factors, which impede it. One of the problems is the requirement of the European Union and the government with regards to raw hide storage. These requirements pertain to tanning pollutions and raw hide storing pollution to environment.

The second problem is related to education and science – there is no higher educational establishment, which prepares specialists for leather industry (especially for hide tanning). If there are no specialists in this area (except for the joint stock company Ritalas employees), it could mean the end of leather industry in Latvia. For this reason, it is necessary to take urgent measures and work out principles of rescuing this industry as soon as possible.

The third problem is lack of specialists and workers in leather manufacturing. The staff and specialists of the leather manufacturer – the Joint stock company Ritalas – comprises 50 employees, only three of them have higher education in leather tanning speciality (they got their education in Russia). It is necessary to find out the ways in which they could pass over their practical skills to others – future specialists.

The fourth problem is related to financing, which plays an important role in the whole system – it affects purchasing of the equipment, educational possibilities, supporting science and specialists and also acquisition of raw material (including prices, transport, etc.).

And the last problem is related to the raw hide material – its storage for a longer period, with a possibility to tan it in Latvia and produce leather. However, other factors, such as lack of professionals, money and technological and laboratorial equipment, do not allow solving this problem. If raw hides are stored improperly, they start deteriorating and become not fit for factory processing. Nowadays NaCl salt is widely used for raw hide storing (but it is a waste use of salt). That is why other manufactories and slaughter houses try to use a different form of raw hide storage. As an example, in slaughter houses in Lithuania, raw hides are not salted, but kept in fridge at an appropriate temperature (in this case, their storage time is shorter than when salting).

EU tanning manufacturers are largely dependent on available raw materials, and Latvia's rapidly renewable resources could easily provide them. Leather tanning industry is strategically important for promoting the national economy development.

In order to meet the requirements of people in the conditions of the population growth, utilization regulations of the available natural resources and services should be as efficient as possible. Social efficiency means that resources will need to be used where they are the most necessary.

Latvia has marvellous reserves of skin materials – a lot of livestock (cows and oxen) are being tended up to nowadays. It can be explained by the old traditions – people have been living on eating meat. Another question is what to do with such byproduct as raw hide. It is absolutely clear that

specialists of many branches in Latvia should raise awareness of this problem. Latvia essentially needs professionals and manufacturers of leather production. Thinking about the future and the improvement of the economical situation, a chain of measures must be planned and implemented, this way giving a space for activities of slaughterers, leather manufacturers and scientists, etc. These processes pertain to sustainability – the full-fledged usage of raw hide in leather industry.

## CONCLUSIONS

Sustainable development is the one that meets present needs without compromising the ability of future generations to meet their own needs.

Sustainability is about ensuring what we are today, how we provide our needs, not harming the ability of future generations to provide for them. Hide is one of the oldest raw materials which has been used throughout the time. Leather industry is the oldest industry in Latvia. But today Latvia has refused from leather handling and processing. At the beginning of the 20<sup>th</sup> century Latvia got a lot of money from selling hides and skins to foreign countries, but nowadays raw hides are not used fully.

Leather industry development is impeded essentially by a great amount of illicit slaughter houses, requirements of the EU, raw hide dealers, lack of professionals, unavailability of higher education establishment for leather handling studies and raw hide storage possibilities.

Sustainability in leather industry is related to meat industry, and specifically beef, and meat industry will remain because people eat and will keep eating meat. A subproduct of this industry is raw hide, which, when being correctly processed, can give a qualitative leather material which can be used in many other industrial fields. Leather is a natural material and resource (economically referred to as land or raw materials) that occurs naturally within the environments that exist as relatively undisturbed by mankind, in a natural form.

The most significant technological and infrastructure challenges would be creating a new coordination and management structure, improving the material flow of the production process.

Today, in the opinion of some short-sighted economists, the industry should decline. The industry leaders and the government should think about the future resources and finances, but not only about meeting the short-term needs.

In the future, priority should be given to new technologies, based on the sustainability principles.

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#### **Ilze Gudro, Andra Ulme. Latvijas ātri atjaunojamo resursu izmantošanas iespējas ilgtspējīgas attīstības kontekstā.**

Raksta mērķis ir atainot situāciju ilgtspējīgu resursu izmantošanā, kā, piemēram, dzīvnieku ādu rūpnieciskā apstrādē, aprakstot un analizējot jēl-ādas materiāla lietderīgumu turpmākai ilgtspējīgai attīstībai Latvijas teritorijā. Darbā izmantotas kvantitatīvās un kvalitatīvās zinātniskās pētniecības metodes, tai skaitā: elektroniskās aptaujas, anketēšanas, arhīva dokumentu izpēte, literatūras un interneta resursu avotu analīze, grafoanalītiskās metodes rezultātu atainošanai.

Raksta galvenais mērķis ir sasniegts – sabiedrība ir informēta par šo resursu pieejamību un tiek dots novērtējums tautsaimniecības attīstības veicināšanai izmantot metodes, kuras vēsturiski attaisnojušas savu pastāvēšanu un ilgtspējīgas attīstības principu ievērošanu.

ES mīecēšanas rūpniecība joprojām ir pasaulē lielākā ādas piegādātāja starptautiskajā tirgū. ES mīecēšanas uzņēmumi ir lielā mērā atkarīgi no pieejas izejmateriāliem un eksporta tirgiem, kurus Latvijas ātri atjaunojamie resursi spētu viegli apmierināt. Latvija šobrīd ir atteikusies no ādu apstrādes un pārstrādes, kas bija populāra pirmās Latvijas brīvvalsts laikā, mūsdienās ādas tiek iznīcinātas. Šobrīd Latvijā darbojas tikai viena ādas apstrādes rūpnīca – Jelgavas ādu rūpnīca A/S Ritalas, kas izmanto Latvijā audzētu lopu ādas, veic to apstrādi, kā arī eksportēšanu.

Tēmas aktualitāti pastiprina fakts, ka pārtikas, t.i. gaļas rūpniecība pastāvēs, jo cilvēki savā uzturā lieto gaļu, savukārt, gaļas rūpniecības subprodukts ir jēlāda, kuru pareizi apstrādājot var iegūt kvalitatīvu ādas materiālu, kur iespējams izmantot dažādās citās rūpniecības jomās. Ādas mīecēšanas rūpniecība ir stratēģiski svarīga Latvijas tautsaimniecības ekonomiskā stāvokļa uzlabošanai.

Tuvākajā laikā nepieciešams liels pētījums par jēlādu uzglabāšanas, kā arī apstrādes iespējām mazāk kaitējot apkārtējai videi (jo mīecēšanas process rada piesārņojumu).

#### **Илзе Гудро, Андра Улма. Возможности использования Латвийских возобновляемых ресурсов в контексте долгосрочного развития.**

Целью статьи является отображение ситуации в Латвии в сфере использования Латвийских возобновляемых ресурсов, как например, промышленной обработки натуральной кожи животных, особое внимание, уделив при этом анализу эффективности использования сырья в контексте дальнейшего долгосрочного развития Латвийской территории. В статье использованы количественные и качественные методы исследования, в том числе: электронные исследования, анкетирование, исследования архивов документов, литературы и веб-ресурсов, анализ источников, графоаналитические методы для изображения диапазонов результатов.

ЕС, по-прежнему, является крупнейшим поставщиком кожи на международном рынке. Предприятия ЕС в достаточной степени зависят от доступа к сырью, которое Латвийские быстро возобновляемые ресурсы могли бы удовлетворить. Латвия в настоящее время отказалась от обработки и переработки кожи, популярной промышленности в период времени первой независимости Латвийской Республики Сегодня кожа уничтожаются, и в Латвии работоспособным является только один кожеобрабатывающий завод – Елгавское АС «Ritalas», которое занимается обработкой кожи и экспортом кожсырья в другие страны, используя кожу скота, выращенного в Латвии.

Актуальность статьи подтверждается тем, что пищевая промышленность, в том числе мясная промышленность, будет продолжать существовать, так как люди едят мясо, в свою очередь, в свою очередь, субпродуктом мясной промышленности является сырье в виде шкур животных. При правильной обработке сырья можно получить материал - кожу высокого качества, который может быть использован в различных других отраслях современной промышленности. Кожеобрабатывающая промышленность стратегически важна для улучшения экономического положения Латвийского народного хозяйства.

Необходимы большие исследования по совершенствованию методов хранения сырья, а также вариантов обработки с минимальными рисками для окружающей среды (в процессе дубления создается загрязнение).