



RESEARCH LETTER

On Forests and Human Health

human health and well-being – nutraceuticals – bioactive compounds – urban forests – pharmaceutical industry – medicine – stress release – forest trail



MAINTAINING FORESTS FOR OUR WELL-BEING

Forests provide a wide range of ecosystem goods and services beneficial to human life, both in urbanized and rural areas. These include food and herbs, pharmaceuticals and nutraceuticals¹, as well as the provision of recreational, cultural and spiritual benefits which positively impact on human well-being.

European Union countries are estimated to incur costs amounting to 3-4 per cent of their gross domestic prod-

uct to deal with mental health issues, which are widespread in OECD² countries. There are a growing number of empirical studies, particularly related to urban forests, highlighting the stress-reducing qualities and positive physiological effects of visits to forests. Furthermore, research on the links between forests and health has led to the launch of various initiatives to establish green spaces or forest trails for stress relief and well-being.

FORESTS: A NATURAL PHARMACY

Forests are also a rich source of health-related products such as nutraceuticals and bioactive compounds. In many developing countries forest products play a key role in traditional medicine. According to the World Health Organization (WHO), over 80 per cent of the world's population rely on plant-derived medication for their health-related needs and more than 60 per cent of cheap drugs are of natural origin.

The diversity of forest plant species from tropical to boreal zones, as well as fungi and microorganisms within host plants will guarantee a source of novel pharmaceutical lead compounds in the future as well as providing a rich natural pharmacy and food source for people in rural areas.

¹Foodstuffs that provide health benefits in addition to their nutritional value

²Organisation for Economic Co-operation and Development

CURRENT THREATS

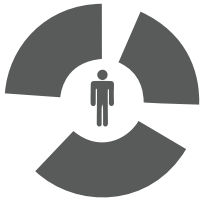
Today, the supply of many of these forest goods and services is under threat. For example, climate change in combination with population growth is likely to lead to reduced forest cover, decreasing the relative availability of forest goods and services for people.

Global urbanization may increase the demand for urban forests and green areas. However, in parallel, urban forest

areas may be destroyed to make way for urbanization. For example, the building of about 500,000 new houses by 2021 in the region of London's Metropolitan Green Belt (according to The East England Regional Spatial Strategy) may lead to existing green areas being replaced by new buildings.

People's health is an important concern for governments and policy-makers worldwide. But the interplay between forests and human health is complex and calls for systematic and interdisciplinary research that can inform policy.

Tytti Sarjala,
The Finnish Forest Research Institute



KNOWLEDGE GAPS

Current developments have fostered a new forest-based bioeconomy whereby economic activities use renewable natural resources in a sustainable manner for the production of bio-based products, nutrition and energy. For example, the European Commission's "Europe 2020" strategy calls for bioeconomy as a key component of smart and green growth in Europe. Already, Canada, Finland, Ireland, the Netherlands, Norway and Sweden have published strategies on how to meet the potentials of the bioeconomy. In Finland, the bioeconomy brings together wood processing, chemistry, energy, construction, technology and solutions related to nutrition and welfare. One great challenge is to improve the bioeconomy knowledge base, notably by developing related education activities and research.

The great potential of forests as a source of nutraceuticals and new pharmaceutical compounds should be utilized more efficiently. The development of high value-added products, such as pharmaceutical compounds and cosmetics, requires collaboration between researchers from different disciplines. However, it takes a long time to discover, screen and test a novel bioactive compound, and to identify its biological functions and properties.

Evidence on the potential utilization of forests specifically for improving psychological well-being and relieving stress is missing, especially for urban areas.

BOX: NEW HEALTH-RELATED PRODUCTS

One of the major problems in utilizing forests for new health-related products is the fact that the path from forest-based raw materials to pharmaceutical products is very long, around 15 to 20 years. Many experts in the fields of chemistry, medical science and the pharmaceutical industry share the view that there are plenty of valid screening methods and disease models that help to identify novel bioactive compounds for various indications. However, the development path from bioactive compounds originating in the forest to medicinal products is fraught with many challenges. For example, protecting intellectual property (IP) rights during the lengthy development phase is a challenge and often triggers early consultation with IP specialists. Intellectual property protection should also help to improve relations between the pharmaceutical industry and basic research.

IUFRO'S TASK FORCE "FORESTS AND HUMAN HEALTH - FORHEALTH"

This Research Letter summarizes the findings of IUFRO's Task Force "ForHealth" between 2011 and 2014. The task force aimed at facilitating the ongoing debate on the interplay between forests and human health, and the dialogue between health and forestry professionals, policy-makers and companies.

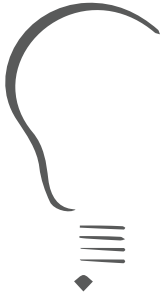
The task force's efforts have complemented recent work by the United Nations (UN), the Food and Agriculture Organization of the UN (FAO) and international research organizations to highlight the relationship between forests, food security and human health. It has supported one of the priority areas of FAO's Forestry Department to promote and develop non-wood forest products (NWFP) and improve their sustainable utilization.



Hannu Raitio (Task Force Coordinator, hannu.raitio@metla.fi),

Tytti Sarjala (Task Force Deputy Coordinator, tytti.sarjala@metla.fi),

<http://www.forhealth.fi>



LESSONS LEARNED

International collaboration is needed in order to expand research on forests and human health. Regional activities promoting the benefits of forests for human health and well-being receive particular attention from people and the media.

It is also noteworthy that local activities in the form of public seminars are useful platforms for dissemination of research results. They help stakeholders to understand the importance of research in this thematic area and also to realize the broader benefits, besides traditional ones, which can be obtained from forests.

FIRST WELL-BEING-THEMED RESTORATIVE FOREST TRAIL IN FINLAND

In 2010, the first well-being-themed restorative forest trail was launched in Finland. Its novelty in comparison with other restorative forest trails was that it included signposts promoting reflection, relaxation and generally improving psychological well-being thus serving to enhance the restorative experience. The trail was constructed as a regional project funded by the European Regional Development Fund and the Council of Tampere Region in collaboration with Tampere University, the Finnish Forest Research Institute and Ikaalinen Spa in Finland. The project obtained great publicity in the media and highlighted novel uses for forests and their potential benefits. This idea then spread successfully to some other European countries through the EU-funded Leader project "The Network of densely-wooded regions in Europe, partner project Forest Trails". The project was nominated as one of the best LEADER transnational cooperation projects in the Nordic-Baltic region in 2013. An introduction to the European project is presented in the ForHealth Newsletter (<http://www.metla.fi/uutiskirje/ForHealth/2013-01/research2.htm>).



CONCLUSIONS

Forests, natural plants and microorganisms are a large reservoir of untapped bioactive compounds to be utilized for various purposes including new medicines for common diseases. However, the sustainable utilization of these resources urgently needs more attention as well as long-term funding.

The long time period, around 15 to 20 years, from the forest to pharmaceutical products raises questions on how to manage intellectual property rights. Solving this IP concern is important to strengthen links between the pharmaceutical industry and basic research.

Globally, the utilization of forests for psychological well-being and for stress release calls for international collaboration. However, it is also important to recognize the importance of local activities that emphasize the role of green areas, especially in urban zones.

In addition to long-term funding, creativity, patience, recognition of innovations, and collaboration between companies, academia and policy-makers are needed to achieve our goals.



A well-being-themed restorative forest trail with deliberate exercises for people was launched in 2010 in Ikaalinen, Finland. The pair of trails includes a mix of forest and countryside trails, the shorter one being 4.4 km and the longer one, 6.6 km.

