

GOAL
3**Ensure healthy lives and promote well-being for all at all ages**

Photo: Wildlife Institute of India

SDG 3 aims at reducing mortality and improving global health, especially for pregnant women, newborns and children. It promotes the eradication of epidemics and communicable disease, better prevention and treatment for narcotic drug, alcohol and tobacco consumption, and reducing road traffic accidents. It also promotes the implementation of universal health care for sexual reproductive health and access to affordable and essential medicines for all.

How do ecosystems and biodiversity support this SDG and its targets?

The benefits and services that biodiversity and ecosystems provide to our health are largely unrecognized and unappreciated, but they have tremendous impacts on our wellbeing and daily lives. Human health ultimately depends on ecosystems which provide the goods and services that underpin a healthy life and maintain people's physical and mental wellbeing, such as food, fuel, shelter, income, clean water, places for recreation and relaxation, cultural sites and sacred spaces. They also help to mitigate and avoid disease outbreaks by controlling populations of disease vectors, buffering the effects of disasters and protecting human settlements, while reducing people's vulnerability and strengthening their resilience to stresses and shocks.

Biological resources offer a direct source of medicines, healthcare remedies and treatments. These range from the natural products and medicinal plants used by millions of people in primary health care, through to the modern drugs derived from wild species of plants and animals—like pain killers or cardiac drugs. Studies of wildlife anatomy, biochemistry and physiology are constantly contributing to the development of medicine. For instance, medical science is observing sharks for immunology or bears for renal disease cures. A decline in the effectiveness of industrial medicines and a rise in the demand for pharmaceutical plants is highlighting the value for pharmaceutical research of indigenous genetic resources from diverse wildlife. Millions of wild species that could benefit research are yet to be genetically or chemically analyzed, or even described, representing a significant source for further development in human medicine. Thus loss in biodiversity can limit discovery of potential treatments of health problems and diseases.

Furthermore, human activities and climate change impacts on biodiversity and ecosystems are affecting the ecology of pathogens and populations of disease vectors like mosquitoes, further increasing the risk of emergence and spread of infectious diseases in animals, plants and humans.

How does UNDP's work **SUPPORT** this SDG?

Case study: Conservation and sustainable use of medicinal plants in three Indian States

India is the second biggest exporter of medicinal and aromatic plants (MAPs) in the world after China. Around 6,000 species are found in India's territory and 90 percent of these medicinal plants grow in India's natural forests. It was estimated that around 65 percent of the population relies on traditional medicine based on these plants as a primary health care (WHO 2002). However, these species are highly threatened by deforestation and unsustainable harvesting, while growing demand for these products is incentivizing further poaching and overexploitation. 316 species of medicinal plants—including Globally Significant Medicinal Plants (GSMPs)—were estimated to be under threat of extinction in India.

The UNDP-GEF project "Mainstreaming conservation and sustainable use of medicinal plants in three Indian states" aims at halting the biodiversity loss that is decreasing the variety and availability of medicinal plants in India's forests, which has national and global socio-economic implications as loss of revenue, loss of a major means of affordable health care and loss of traditional knowledge about MAPs, as well as reduced option values. The project is working in three states; Arunachal Pradesh in North-East India, Chhattisgarh in Central India and Uttaranchal in North-west India, home to about 40 percent of Indian medicinal plants. The project has also been working at the national level through its contribution to the revision of the National Forest Working Plan Code (NFWPC), in effect from 1 April, 2014.

At the state level, the project established two institutional mechanisms—Sustainable Harvest protocols for ten key species and 12 Bio-cultural protocols—to guarantee the conservation of medicinal plants, as well as ensure equitable access and sharing of benefits derived from the use of genetic resources. During the project, conservation assessment and management plan exercises were conducted, leading to the identification of 19 species under threat of extinction.

At the local level, the project's conservation model primarily focused on establishing "no-harvest areas," called Medicinal Plants Conservation Areas (MPCAs), to protect globally significant medicinal plants. The communities are encouraged to protect the area in order to conserve the habitat, species and genetic



A patient consulting a traditional healer. Photo: UNDP India

diversity in this area. In some MPCA sites, the project also designates Medicinal Plant Development Areas (MPDAs) which usually surround the MPCA core area. In these areas, the community is encouraged to sustainably collect medicinal plants for local use and trade as well. By June 2014, the project had succeeded in setting up 24,047 hectares of MPCAs and MPDAs, protecting 32 GSMPs.

Moreover, the three project states have undertaken plantation of various medicinal plants, including GSMPs, on 13,130 ha. This is the result of the training, capacity building and knowledge sharing activities undertaken by the project. The Village Botanist Course, workshops and exposure visits helped in training over 500 front-line staff of state forest departments, traditional healers, local traders, rural youth and women on the healing properties of plants and how to harvest them without destroying the forest.

The project has been able to spread knowledge and raise awareness on the value of medicinal plants through these activities and an intense communication campaign, including the development of brochures, booklets, films, jingles, radio programmes, mascots and puppet shows visiting remote villages. As a result, in Chhattisgarh traditional healers and State Medicinal Plants Boards have led nearly 50,000 households to install "Home Herbal Gardens" by distributing free seeds and training on cultivation. Curriculum on the importance of medicinal plants conservation have been developed for Indra Gandhi National Forest Academy and State Forest Training Academies for front-line forest staff in the three project states.

So far, this project has been extremely successful in mainstreaming conservation and sustainable use of medicinal plants, and has exceeded many of its targets concerning conservation areas and institutional mechanisms especially. It was able to protect and spread the knowledge of traditional healers while raising awareness and capacity about medicinal plants harvesting, cultivation and use.

PROJECT: Mainstreaming conservation and sustainable use of medicinal plants in three Indian states

MAIN DONORS: GEF, UNDP

LOCATION: India

DATE: 2008-2015

WEBLINKS: http://www.in.undp.org/content/india/en/home/operations/projects/environment_and_energy/mainstreaming_conservationandsustainableuseofmedicinalplantdiver.html

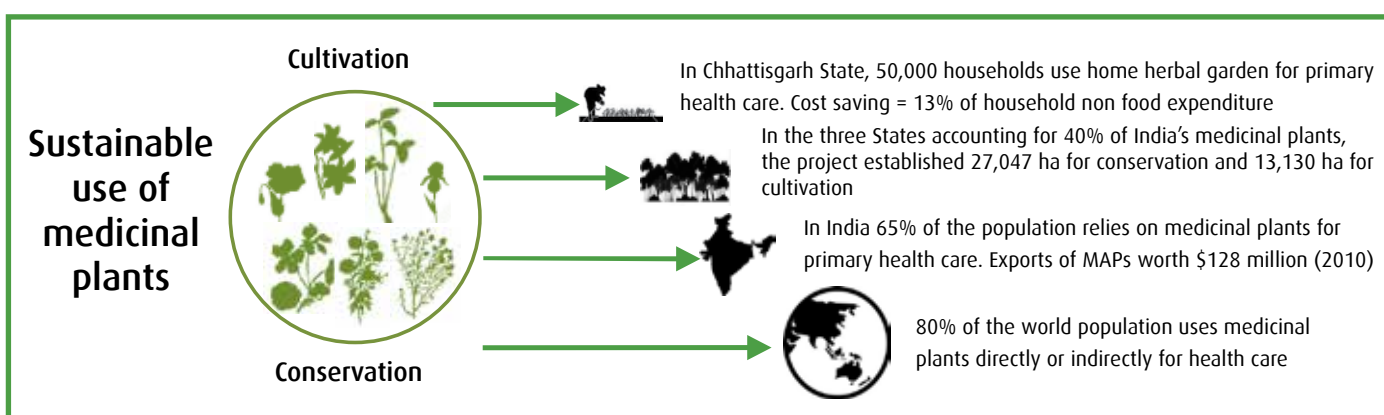


A village wall depicting traditional practices of collection and use of medicinal plants. Photo: UNDP India

Nature count\$: Impacts of the project on access to medicine

The establishment of Home Herbal Gardens in Chhattisgarh State as a result of the project guaranteed access to medicinal plants treating cough-cold, burn injuries, wounds, stomachache, headache and skin conditions to 50,000 rural households, securing a savings of around US\$49.5 in health care expenditure per year for a family of five, representing 13% of each household's expenditure on non-food goods and services.

13,130 ha of medicinal plants cultivation areas were set up by the project, along with 24,097 ha of protected areas for medicinal plants. This contributes to sustaining the production of globally significant and endangered medicinal plants such as *Taxus wallichiana*, a source of the anti-cancer drug paclitaxel, identified as an essential medicine by the World Health Organization (WHO), and which benefitted around one million people in its first ten years of use. The protection and cultivation of medicinal plants in these three States preserves a sustainable supply for the 830 million Indians using traditional medicine—mainly plant-based—for primary health care. It also contributes to sustaining the production of herbal medicine for a global market worth US\$83 billion, and consumed by around 80% of the world population.



- ✓ Better access to medicine
- ✓ More opportunity for pharmaceutical research discoveries



By cultivating and protecting medicinal plants in these three states the project contributes to securing access to quality and affordable medicine (✓SDG Target 3.9) to the populations relying on them for primary health care, as well as to enabling the conservation of a vital resource for future pharmaceutical research for the development of plant-based medicine for communicable and non-communicable diseases (✓SDG Target 3.4, 3.b).

How the impacts were calculated:

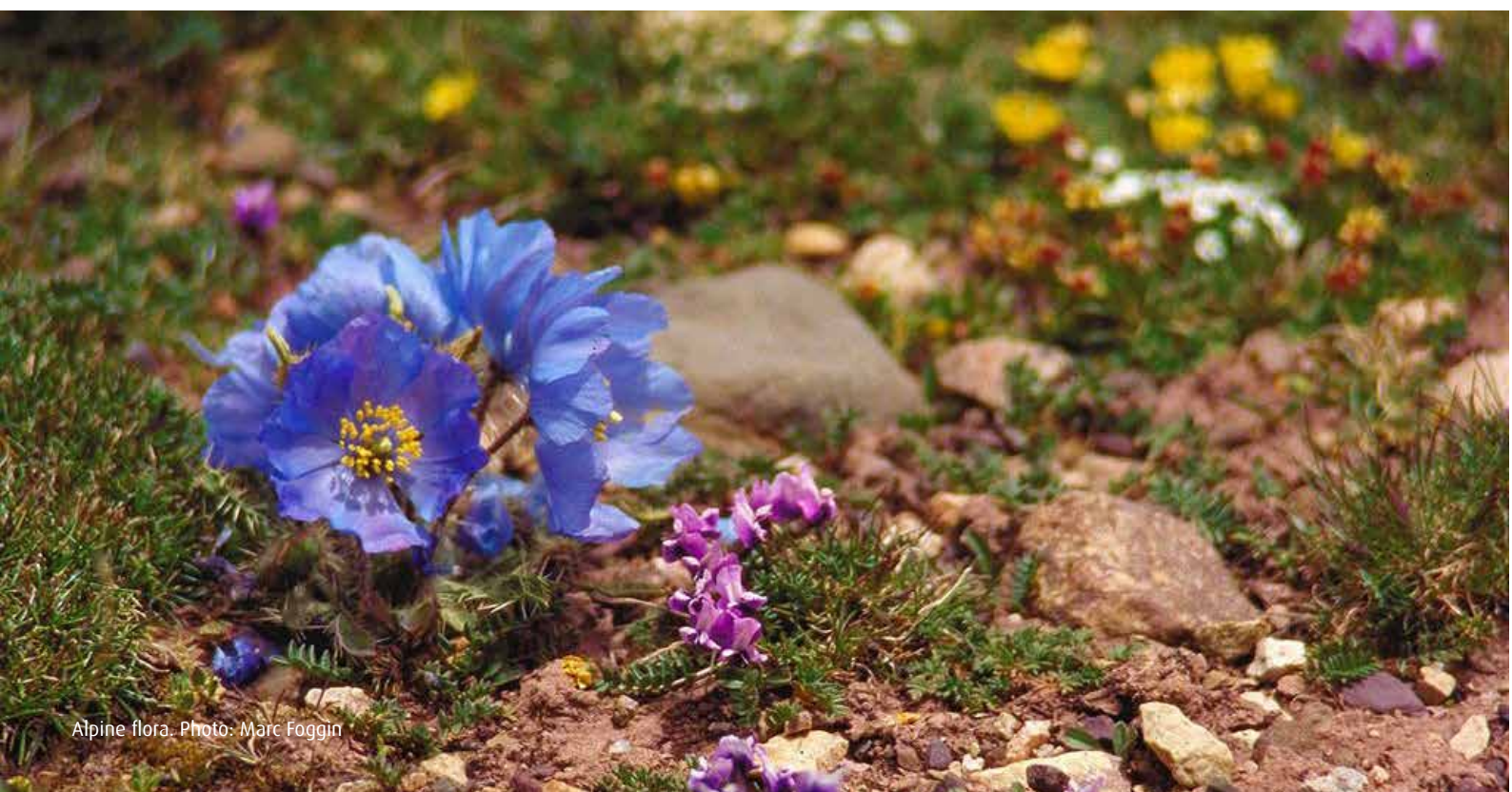
The project reported in June 2014 that around 50,000 households set up home gardens for the cultivation of medicinal plants as a result of training and awareness campaigns including distribution of seeds. The total monthly consumer expenditure in Chhattisgarh was estimated at an average of 1,156 Indian Rupees (Rs.) or US\$17.3 per capita (NSS 2013), just under half of which (Rs 513) is spent on non-food items (NSS 2015), of which around 11 percent or 55 Rs (US\$0.78) is spent on medicines (NSS 2015). The average size of rural households in Chhattisgarh state is 4.5 (Census 2013). Thus a family spends on average 247 Rs on medicine per month and 2,970 Rs per year or US\$44.

The project implementation review from June 2014 also reported that the project succeeded in setting up 13,130 ha of MAPs cultivation areas and 24,097 ha of Conservation and Development areas (MPCAs and MPDAs) as mentioned above. It also provided a non-exhaustive list of medicinal plants brought under cultivation by the state.

State	Area (ha)	Significant MAPs cultivated
Arunachal Pradesh	4,211	<i>Swertia chirayata</i> , <i>Acorus calamus</i> , <i>Cinnamomum</i> , <i>Stevia</i> , <i>Jatamansi</i> , <i>Aconitum</i> , <i>Embilica officinalis</i> , <i>Moringa oleifera</i> , <i>Taxus wallichiana</i> , <i>Xanthoxylum armatum</i> , <i>Rubia cordifolia</i> , <i>Paris polyphylla</i> , and <i>Illicium griffithii</i>
Chhattisgarh	2,075	<i>Aegle marmelos</i> , <i>Santalum album</i> , <i>Gmelina arborea</i> , <i>Azadirachta indica</i> , <i>Terminalia arjuna</i> , <i>Asparagus racemosus</i> , <i>Embelia tsjeriam-cottam</i> , <i>Terminalia chebula</i> , <i>Terminalia bellirica</i> , <i>Embilica officinalis</i> , <i>Lawsonia innermis</i>
Uttaranchal	6,214	<i>Embilica officinalis</i> , <i>Cinnamum tamala</i> , <i>Picrorhiza kurrooa</i> , <i>Aconitum heterophyllum</i> , <i>Saussurea lappa</i>

Among them, *Taxus wallichinia* was identified as a source for an anti-cancer drug named paclitaxel (Press). The paclitaxel was first developed from the *Taxus brevifolia* which grows in the forests of the United States. It is one of the essential medicines listed by WHO, which determines the minimum medicinal needs for a basic health-care system, listing the most efficacious, safe and cost-effective medicines for priority conditions. Paclitaxel has been administered relatively successfully to a million people affected by ovarian cancer, breast cancer and non-small cell lung cancer between 1993 and 2003 (Press).

It was estimated that between 65% and 80% of Indians and between 60% and 90% of the population in most developing nations use traditional medicine as primary healthcare. Some developed nations also largely use traditional medicine as complementary health care—70% in Canada and 80% in Germany (WHO 2002, WHO 2013, UNDP 2008). Traditional medicine largely relies on medicinal plants for drugs and concoctions; it is thus safe to say that 830 million Indians (65% of the total population) rely on herbal medicine for primary health care needs (WHO 2002). Broad estimations suggest that 80% of the world population use herbs for health care either directly through traditional medicine or indirectly through pharmaceutical products based on medicinal plants (Robinson & Zhang 2011, Rivera et al. 2013, Kunle 2012). The market for herbal medicine was estimated to have reached \$83 billion in 2008 (Robinson & Zhang 2011, Rivera et al. 2013), and is expected to grow exponentially up to \$5 trillion by 2050 (Aneesh et al. 2009).



Alpine flora. Photo: Marc Foggin

Due to a lack of precise data and information on the project target areas and their yield, it was not possible to calculate the contribution that the conservation and cultivation areas set up by the project will have in India's further production of medicinal plants. However, it is important to note that India is the second largest producer of MAPs in the world after China, and the three states targeted by the project are home to 40% of Indian diversity of medicinal plants. Thus the protection and cultivation of medicinal plants in these areas are expected to have a positive and significant impact on sustaining the global supply of medicinal plants in a growing market.

All expenditure figures were updated to 2015 price levels according to the World Bank Indian CPI, and then translated into rupees at current exchange rate of 1INR = \$0.015.



Sun drying of medicinal plants. Photo: UNDP India

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