



By Sohail Yusuf, Published: August 31, 2016

Earth is a very salty place to live in. Approximately 3/4th of the planet is covered in water, most of which lies in saline seas, and a large percentage of our lands is affected by secondary salinization. There are alarming ecological consequences if we open up new lands for cultivation and the possibility of finding new fresh water resources seems remote.

So Pakistani scientists have patented a simple way which could turn a barren, salt-laden land into a lush patch, mainly for animal fodder and other important by-products like medicines and biofuels.

Researchers at the Institute of Halophytes Utilization (ISHU) at Karachi University have studied the natural salt-tolerant plants known as halophytes over the past twelve years. The team surveyed different areas of Sindh and Balochistan and, with the traditional knowledge of the local herdsman, selected – *Panicum turgidum* – a halophyte grass which can be used for cattle fodder.

Scientists from the institute first planted the *P. turgidum*, also known as desert grass, in a rectangular plot on saline soil. Then they planted a border of the *Suaeda fruticosa* plant – another very common halophyte used for various purposes – to absorb the salt from the ground, thus, keeping salt levels at a minimum in the *P. turgidum* grass. The border of *S. fruticosa* was planted 50 cm away from the main plot of grass and acted as a salt buster in the whole ecosystem. In doing so, they proved that *S. fruticosa* can be used as a companion crop which helps the main fodder for cattle thrive.

Halophytes – from field to farm

Taking their project to the next level, the ISHU team tested the fodder at a cattle farm located in Hub, Balochistan. By using the harvest system, they replaced the traditional forage with the *Panicum turgidum* and observed the results. The fodder was harvested in salt-laden land and irrigated with mild brackish and seasonal flood water.

In summer, the grass grew to a meter within 25 to 30 days and livestock including cows, sheep and goats fed on it. The palatable and easily digestive halophyte enhanced the overall growth of the cattle as compared to other more costly fodders that are generally used for livestock.

An additional benefit is that the grass could be harvested at least 12 to 14 times a year which could help the livestock living in brackish, arid lands.



Dr. Bilquees Gul (ISHU Director)

“*Panicum turgidum* proved to be a potentially sustainable cattle feed alternative to maize. The animals were finally butchered and we examined the quality of the meat which was very good. The cattle farm owner himself admitted that the cattle had produced a low fat beef,” says Dr. Bilquees Gul, Director of ISHU.

The harvesting method was highlighted in 2009 as “Editor’s Choice” research work in weekly journal “Science” published by the American Advancement of Science (AAAS). In the same year, ISHU was declared the UNESCO Chair of Halophytes to promote research and cooperation in the region. Interestingly, it was then, the first chair of its kind in the world.

Saline land is a big menace in Pakistan as 6 million hectares of land is choked with salt and has turned into white brackish dunes.

“Now we are keen to push this process at a commercial level as we have observed starving cattle eating even soft plastic in many areas across Pakistan,” added Gul.

The team has also identified another halophyte named *Desmostachya bipinnata* as a promising source of food for a wide range of livestock.

Healing Halophytes

The findings of ISHU were shared worldwide and many countries including Somalia and Egypt have showed an interest in collaborating with the institute. Karachi University researchers have investigated halophytes for years to find edible oils, medicines and even for use as biofuels.

For instance, the halophyte *Suaeda fruticosa* is used in baking soda, its leaves have antibacterial, antioxidant and anti-cancerous properties, and the tree itself is used as fuel. Another type of halophyte *Suaeda monoica* is used as an ointment for wounds and in traditional medicines for the treatment of hepatitis.

Halophytes have traditionally been used as home remedies for the treatment of several diseases and health problems by communities ranging from Baltistan to Balochistan. Under the supervision of Dr. M. Ajmal Khan, former director of ISHU, scholars from the institute have catalogued dozens of halophytes for their potential medicinal values.

Similarly, there are a variety of other halophyte plants in Pakistan that could also be used as a source of edible oil. The Institute has analyzed many seeds and discovered that the quantity of oil present in them varies from 22 to 25% with high amounts of unsaturated fatty acids ranging from 65 to 74%.

Another extensive survey shows that many species of halophytes can be used as biofuels. These halophytes are common and are not in the human food chain, thus, ending the debate of food versus fuel before it even begins.

Halophytes agriculture could play a very important role in poor areas as a cash crop. It works effectively against desertification and land erosion, and improves not only the soil quality but the overall ecosystem of the area. Halophytes may prove to be the perfect solution for a country like Pakistan but further research is still needed to find more natural products from this much neglected group of plants and grasses.