



In semi-arid Rajasthan the collection of rainwater is essential: rehabilitation of village ponds.

Photo: Sustainet

How do small farmers respond to climate change in Rajasthan?

Climate Change is already a reality for a majority of Indian farmers. In Rajasthan, where water availability is a crucial issue and drought a prominent feature of the climate, farmers are struggling to cope with additional challenges induced by a warming environment. Sustainet India conducts a study to collect successful adaptation practices directly from local communities. Selected findings are presented below.

Kalyan mal Kishan, a farmer from a village in Rajasthan, had a good year. Thanks to irrigation, he managed to get a decent crop from his small fields,

Kaspar Akermann

Lea Herberg, Project Officer

Anna Kalisch

Deutsche Gesellschaft für
Technische Zusammenarbeit (GTZ)

Eschborn, Germany

Lea.Herberg@gtz.de

despite the fourth consecutive year of drought. He was also able to grow fodder for his cattle, whose milk he sold to the close-by dairy enterprise. This earned him the little money he needed to buy the things he cannot produce himself.

Not all farmers in the area are so fortunate. As Mr. Kishan, they mostly rely on a mixture of agriculture, cattle rearing and seasonal migration for their livelihoods. The majority among them are smallholders, cultivating less than two

hectares of land. Irrigation coverage is low and so are the adaptive capacities of the villagers to climate related risks. Such risks are plenty in the semi-arid climate of Rajasthan's eastern planes, where water is scarce most of the year. Over 80 percent of the annual rainfall occurs during the short southwest monsoon season from July to September, hence the nine remaining months are dry. High climatic variability expresses itself in prolonged drought periods, reoccurring in short intervals.

“Many semi-arid and arid areas are particularly exposed to the impacts of climate change and are projected to suffer a decrease of water resources (high confidence).”

(IPCC 2007/2008)

According to some of the farmers, the weather has become even more unreliable in the past decades. They witness more erratic and untimely rainfall as well as less rainy days. Especially farmers depending on rain fed agriculture and thus with little contingency measures at their disposal are struggling to adapt to the additional stresses. Sometimes, the only coping strategy available is to temporarily abandon fields and look for employment in nearby cities.

Community based adaptation strategies

However, there are some sustainable adaptation strategies, reducing the vulnerability of rural communities to a good extent. A good example for community based adaptation, making efficient use of limited resources, exists in the village of Bhipur: A local NGO called Cecoedecon helped the inhabitants to form a village development committee and to identify the village’s most urgent problems. With the help of NGO specialists, possible solutions were discussed and put into practice:

Water management. The most limiting factor for agricultural activity in the region is water availability. Therefore, water conservation practices are key to any successful adaptation strategy. The committee decided to focus on water harvesting and controlling

Community based approaches to adaptation practices benefit the most vulnerable sections of the population.

Water management in Bhipur: selected technical measures and their impacts

| Technical measures | Impacts of the measures |
|---|---|
| Digging of feeder channels to collect and divert additional rainwater into the village pond | Year round availability of water in the pond that can be used for irrigation, to keep fish and to grow water chestnut |
| Construction of gully plugs to slow down water runoff and increase water uptake of the soil | Less soil erosion |
| Construction of bunds around fields to preserve water and topsoil | Formation of natural ponds behind the plugs, serving as additional drinking sources for cattle |
| Deepening of wells for allocation of drinking water | Increase of soil moisture and prevention of erosion |
| | Guaranteed drinking water in time of drought |

erosion, next to seed conservation and grain storage. The conducted technical measures (see table) resulted in higher soil moisture, which increased crop yields. Even previously barren land could be cultivated again.

Shifting cropping patterns to more heat adapted and less water demanding varieties is a strategy already

practiced by farmers: “We shifted cropping patterns to local varieties of pulses, green gram, millets and mustard, which are less water demanding. Rotating green gram and mustard works very well and both crops have a ready market. We use the money to buy additional wheat for our Rotis” (*Indian bread*), explains farmer Ram Prasad Jat.



Photo: Sustainnet

Zusammenfassung

Wasser ist knapp in den semiariden Gebieten im indischen Rajasthan. Zusätzlich verstärkt der Klimawandel den Druck auf knappe Ressourcen. Unregelmäßige oder ganz ausbleibende Regenfälle zwingen viele Kleinbauern, ihre Felder zumindest temporär aufzugeben, um in den Städten nach Arbeit zu suchen. Partizipative Wassermanagementprojekte wie im Dorf Bhipur, der Anbau wassergenusamer Feldfrüchte und nachhaltigere Bewirtschaftungspraktiken sind Adaptationsstrategien, die den Bauern das Fortführen ih-

rer Aktivitäten trotz Klimarisiken erlaubt. In Zukunft wird Anpassung essenziell sein, um Landflucht zu verhindern und die Ernährungssicherheit der Bevölkerung zu garantieren.

Resumen

El agua es escasa en las regiones semiáridas de Rajasthan en la India. Adicionalmente, el cambio climático incrementa la presión sobre los recursos exiguos. Las precipitaciones se han hecho irregulares y en algunos casos incluso han cesado por completo. Esto obliga a muchos

pequeños campesinos a abandonar sus tierras al menos temporalmente y buscar empleo en las ciudades. Los proyectos de gestión participativa del agua (como en la aldea Bhipur), el cultivo de productos agrícolas que subsisten con poca agua y las prácticas sostenibles de explotación agrícola son estrategias de adaptación que permiten a los campesinos continuar con sus actividades a pesar de los riesgos climáticos. En el futuro, la adaptación será esencial para evitar la migración hacia las ciudades y garantizar la seguridad alimentaria de la población.

Input cost reduction. Reducing dependency on high cost inputs and thus monetary losses in case of crop failure is another promising strategy, as vulnerability to external shocks is buffered. Such practices include the use of bio-pesticides made of locally available plants as Neem, the application of cow dung and green manure instead of costly chemical fertilisers, as well as the establishment of local seed banks, replacing expensive hybrid seeds available on the market.

ity building work among the villagers. The project's sustainability is guaranteed through the continued work of the village committee.

However, climate change is increasing the pressure on already scarce resources. Without efficient adaptation measures, migration towards the cities will reach new heights. As a farmer from the area puts it: "Nowadays, migration rates are already high in our village. If there is no action, even more people will have to abandon their fields and seek work in the cities."

More information

- Sustainable Agricultural Network, Sustainet: www.sustainet.org
- Centre for Community Economics and Development Consultants Society: www.cecodecon.org
- Intergovernmental Panel on Climate Change: www.ipcc.ch/ipccreports/tp-climate-change-water.htm
- World Bank, Climate Change Portal: <http://sdwebx.worldbank.org/climateportal>

Success factors and remaining challenges

The Bhipuri project is remarkable as it benefits a whole village, including landless laborers, who were able to find work on the fields of their co-villagers. A major part of the success is due to the preliminary work of the village committee, allowing for well-directed interventions. Such community-based approaches benefit the most vulnerable parts of the population. A vital part of the project has been capac-



In a workshop the farmers of Bhipur village plan their cropping strategies.

Photo: Sustainet