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Can development interventions reduce human pressure on forest? A case study of a long term observation in India.

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Introduction

There is growing concern about the degrading and shrinking of tropical forest (Wright and Muller-Landau 2006) while tropical dry forests are considered one of the most vulnerable forest types (Janzen 1988; Miles et al. 2006). Population growth is often perceived as a main driver of these phenomena. Studies on a global scale find a correlation between population growth and deforestation rates (Koop and Tole 2001; Uusivuori et al. 2002) while an increasing GDP may be correlated to reduced deforestation rates (Koop and Tole 2001). Even though this trend is verified by some studies on local scale (e.g. Estes et al. 2012) it does not hold true for all local contexts in the Tropics (e.g. Davidar et al. 2010).

Long term observations of both, intensity of human impact and changes in forest quality are needed to verify the impact of socioeconomic factors like population and economic development on deforestation and, even more, forest degradation and regeneration. We have been able to compare data on human pressure on forests for over 21 years and to link them to local socioeconomic data for the Kadavakurichi Reserved Forest (KRF, Dindigul District, Tamil Nadu). The first data on the human impact on the Kadavakurichi RF was taken from a foot path survey conducted by the Palni Hills Conservation Council (PHCC) around the Kadavakurichi RF in the years 1990/91 (PHCC 1991). We repeated the foot path survey in 2012 and compared the results with those of 1991.

The Kadavakurichi RF is a small hillock, ~10 km², at the foot of the southern slope of the Palni Hills with an annual average precipitation of 758 mm between 1901 and 1996 (maximum = 1203 mm, minimum = 8 mm). The forest is a degraded dry forest type with a relatively low average cover of trees (31%) and a relative high grass cover (22%). Almost a quarter of all trees showed signs of fire and wood cutting in 1999/2000 (Schmerbeck 2003).

The project area identified by the PHCC (1991) covered 40 km² including the KRF. The area adjacent to the forest harbours 19 villages with 13330 people (PHCC 1991). The main sources of income were farming, agricultural labour, wood cutting and animal rearing. The latest census (CIRHEP 2010) shows an increase of the population to 17861 people; agriculture and agricultural labour are still the main occupations, but wood cutting and animal rearing are not dominant sources of income any more.

From 1988 to 1997 the PHCC was almost the only NGO in the study area that carried out development work. In 2012, we counted nine organisations working in the study area, one of them being a programme under the Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA), which guarantees 100 days of employment per year for any adult from a rural Panchayat in India.
This study aimed to understand differences in the type and intensity of human impact on the forest between 1991 and 2012 and the reason for identified trends.

Material and Methods

Foot path survey 1991

The foot path survey in 1990/91 aimed to identify the intensity of human pressure on the forest, the importance for local livelihoods and the value of products gained. The PHCC identified 43 foot paths entering the forest and 19 interview spots covering all 43 paths. The interviews were taken on one day per week, over seven weeks from 23.12.1990 to 28.01.1991, each week on a sequential weekday. People and heads of livestock (by type) entering the forest were counted. The people were asked why they enter the forest, their place of origin, the amount of forest produces they collect as well as if they use the product for marketing or domestic purposes. We retrieved all data from the final report (PHCC 1991).

Foot path survey 2012

The PHCC is no more active in the area, but the Centre for Improved Rural Health and Environmental Protection (CIRHEP), founded by former PHCC staff, continues the work. With the help of CIRHEP we re-identified the foot paths according to the map in the report (PHCC 1991) which were still the same as in 1990/91. The map did not contain the interview points which were newly identified.
We repeated the survey of 1990/91 with only two alterations: (1) due to organisational reasons we had to shift the survey by a week. (2) we added a question on the importance of the product they utilised for their livelihood in three categories: - Cannot do without, - Equal to other means of income, - Not important at all

Household survey 2012

Using this survey we wanted to explain the findings of the foot path surveys. With the help of CIRHEP and local people we identified villages with the largest number of households (HH) associated with a change in pattern of utilisation of forest products and stratified them according to their use into four categories: 1: fuel wood increase, 2: fuel wood decrease, 3: livestock increase, 4: livestock decrease. “Decrease” means the practice has been given up, “increase” means it has been taken up. Within each stratum we selected 5 households in each village, if the stratum was present. In total we interviewed 75 households in 7 villages (stratum 1: 0 HH; 2: 25 HH; 3: 15 HH; 4: 35 HH). We asked the respondents questions regarding the support by development organisations and why forest utilisation pattern had changed.

Results and Discussion

Foot path survey

The number of people entering the Kadavakurchi RF for any purpose decreased from 1707 in by about 37% in 2012. The collection of Non Wood Forest Products decreased by 97% and 85% fewer people entered the forest for fuel wood collection (from 464 to 68 people in 1991

and 2012, respectively). The amount of fuel wood utilised went down from 646 to 157 t/year. While in 1991, 50% of the respondents sold the fuel wood they collected in the forest, all respondents in 2012 used the fuel wood only for domestic purposes.

The number of people grazing livestock in the forest was almost constant in both years while the heads of livestock increased by about 32 % to 30274 in 2012. While numbers of most livestock types decreased from 1991 to 2012, the number of goats had greatly increased. In both years, around half of the animals were brought from outside the study area while the proportion of livestock from within the study area increased by about 10% from 1991 to 2012 (figure 1).

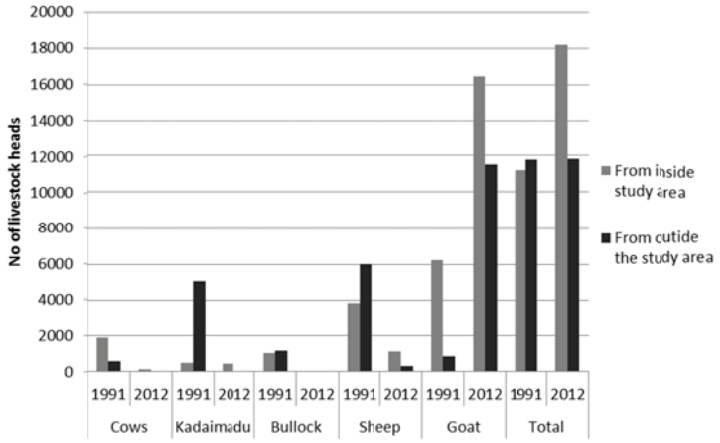

Figure 1:
No of livestock entering the Kadavakurich RF in 1991and in 2012 (Kadaimadu: Cows kept only for dung production)

The statements regarding the dependency on the activity carried out in the forest differed amongst the user groups. While 63% of the persons grazing livestock stated this activity to be an essential part of the livelihood ("I cannot do without" and "Equal to other means of livelihood"), only 11% of the fuel wood collectors made this statement.

Reasons for change

The entire interviewed HH had received support by through development programmes while employment, loans by development organisations and educational programmes for children were the most widespread. What is striking is that the type of development programme and the proportion of HHs benefiting from them hardly differ between those HH who gave up livestock rearing and those who took it up (figure 2).

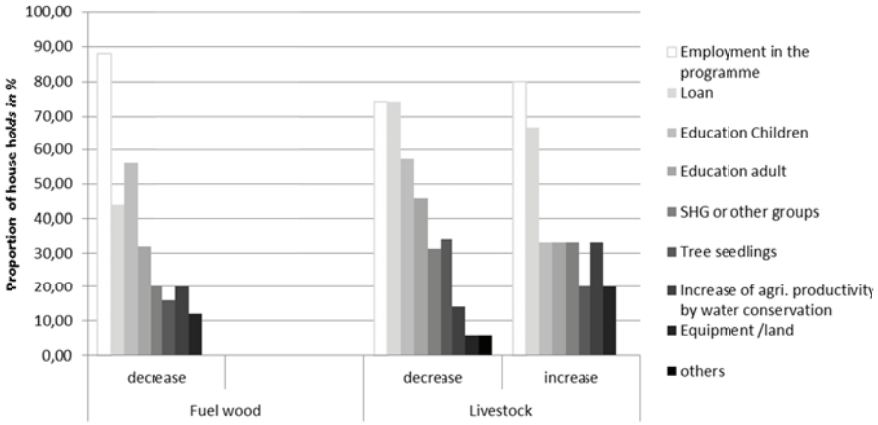

Figure 2:
Proportion of household benefitting from different development programmes in percent of the interviewed HH in each stratum.

It seems that to some extent, livestock grazing in the forest is independent from the development effort in the region, while fuel wood collection is not. The latter is challenging physical work which is likely to be dropped for any less laborious alternative of income, while goat rearing is a comparatively comfortable exercise. We observed that almost all

graziers kept to the lower part of the hillock, just crossing into the Reserved Forest border, while people who collected fuel wood went to higher elevations. There is also a difference in the value of the product. A bundle of wood may sell in the market for 150 Indian Rupees (INR) (bit more than 2 Euros) while according to CIRHEP staff, a kilogram of goat's meat fetches 400 INR or even more.

Asked to name the reason for their shift in forest utilisation pattern all respondents of all strata stated alternative sources of income. The majority of households in each stratum (2: 56%, 3:46% and 4:40%) stated work as daily labour as an alternative source, while flower cultivation and small scale businesses were other important sources of income. The only development programme mention was MNREGA (36, 13 and 11% for each stratum, respectively). This programme is surely a source of employment, but the vast development of the construction and small industries in the area over the past 30 years (observation of authors) is likely to provide a much bigger pool for alternative jobs. The enhance flower cultivation was often mentioned along with increased agricultural productivity (figure 2) and linked to a strong increase in the availability of ground water due to the water conservation work conducted by CIRHEP.

The participation in educational programmes (evening's schools etc.) of children can be twofold: (1) enhancing employment options of young adults and (2) keeping children from being involved forest utilisation related work. The report of 1991 (PHCC 1991) does provide information on the ratio of children (< 16 years of age) only for fuel wood collectors (23%) but not for the entire population counted. However, it can be expected to be around the same value. In 2012 it was hardly 5%.

Ranking next in importance as a reason for not collecting fuel wood any more, mentioned by 40% of the former fuel wood collectors, was the decrease of fuel wood demand. We found this not to hold true for local markets but it is very likely that recent government programmes subsidising gas cylinder have reduced domestic demands for fuel wood. The "support from development organisations" was mentioned only by 16% of this group, but by 26 % of those HH who gave up livestock grazing, and by 33 % of those who took up forest grazing.

Conclusions and Outlook

The conclusion is that pressure on the forest at a local level does not correlate with the increase in human population. Other drivers like the economic development providing jobs and development interventions play a role.

The question asked in the title cannot be answered with a clear yes or no. The presence of development agencies and their programmes seems to have led to increased incomes allowing people to give up laborious forest utilisation practices. But even households that have received benefits from developing programmes switched to forest utilisation in the form of grazing, most likely because of attractive prices for their products.

It is necessary to look closely at the local dynamics in forest utilisation pattern over long time periods to build a foundation for design and implementation of development interventions.

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