

IMPACT OF IRRIGATION ON DESERT DEVELOPMENT — A CASE STUDY OF THAL DESERT IN PAKISTAN

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Abstract

Arid lands form a large percentage of the total area of Pakistan. This sizeable portion of the land has predominantly pastoral economy and is for the most part desolate and unproductive. Until irrigation came to it, Thal too was a typical desert with low rainfall, hot and desiccating winds, sand storms, scarce water and food and of course, the poverty stricken people. Although the need for the development of this tract was felt since long but the project could materialise only after 1947 when refugees from across the border created tremendous pressure on the meagre land resources of newly created Pakistan. To give a start to the poor new comers and even more poor local population, Thal Development Authority was created. A well thought out programme of construction of canals, roads, houses and other amenities of life was worked out and successfully completed. Heavy machinery like bulldozers was put to the maximum use to level the land for agriculture and afforestation. Hither to unemployed young and the old got job opportunities in mills, factories, construction and afforestation works. Land lying waste for ages was turned into highly productive agricultural fields, fruit orchards and tree plantations. Education and medical facilities were brought at the door step of villagers. Although this programme greatly disturbed the ecological complex of the desert and had a very disconcerting effect on the indigenous fauna and flora but it clearly changed the social and economic conditions and pattern of life of the people in that part of the country.

1. The Tract (2, 3)

Except for a small area (1.5%) in the outer Himalayas which is humid and per-humid and a little larger area (8.5%) in the submountainous region which is dry and subhumid, the rest of Pakistan is arid (72%) and semi arid (18%). Although according to this classification, desert like conditions exist over a large area, the desert of Thal presents a very interesting study so far as the impact of human interference in bringing about a change in the ecosystems is concerned. The change has been all the more perceptible and quick due to provision of canal irrigation through a network of channels.

The tract known at Thal, lies between the river Indus and the joint course of rivers Jhelum and Chanab, roughly 30° to 32.5° N. lat. to 71° to 72.3° E. long. The desert covers an area of 7500 square miles. It is believed to have been formed due to successive recession of the river Indus which once flowed down in its centre. It deposited vast stretches of sand as it changed its course to the West. The wind blew the sands into heaps and dunes which dot the landscape. The tract went out of cultivation gradually due to creation of arid conditions. Once

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lushgreen pastures turned into uneven land, interspread with scattered level chunks where only rainfed agriculture was possible.

Natural vegetation of this desert is xerophytic in character. It consists mostly of low shrubs and grasses. The few trees concentrated around villages or inaccessible niches could be counted on fingers. Survival of the people was closely linked with a pastoral economy. The villagers eked out a living through rearing of sheep, camel, and goats which in their turn played an active role in deterioration of the ecological complex. The natural vegetation received a perpetual set back as since times immemorial thousands of nomadic tribesmen known as "Pavindas" wandered into Thal every year from across the borders looking for grazing grounds and some work during the winter.

The population has always remained very poor. A constant struggle against nature, most capricious in its mood had left the people completely exhausted to initiate a sincere effort to improve their economic lost. Some of them never bothered to have a permanent houses. They would eat a little barley or wheat and spend rest of the year on wild fruits. The shepherd and the camel graziers managed to survive on the milk and meat of their sheep, goats and camel. The life was arduous in the scorching sun which would register a temperature of 45°C in summer and devastating sand storms mercilessly lashing the land and its people from April to August every year.

Thousands of unproductive hectares, shifting sand dunes, an uneven topography, some thorny unpalatable bushes, a very thin and emaciated population with flocks of sheep, goats and camel is a fairly balanced biological set up in a hot and arid tract like the Thal. Left to itself this would have perpetuated for centuries adding to the folk-lore and tales of the desert. This was, however, not to be. These "lotus eaters" were made to wake up from their slumber with a jolt caused by establishment of the Thal Development Authority.

2. The Thal Project (2, 3, 5)

In 1947 a large number of muslim refugees from India arrived in Pakistan. The pressure on land and space was tremendously increased. These people could not be accommodated in the already settled districts. It, therefore, became essential to remove the congestion. It could only be possible by parcelling them out to the sparsely cultivated and thinly populated Thal area. To help the local population and refugees, the Government decided to make canal irrigation facilities available to a greater part of Thal. The scheme in hand was, therefore, considerably modified and extended. The speed of work was accelerated to complete the project as early as possible.

So, in early 1948, one of the greatest land reclamation projects in Asia was started. Jinnah Barrage, named after the father of the nation was constructed at Kalabagh on river Indus where it just comes out of the hilly terrain. The large outlay on the irrigation project which was estimated as 50m US dollars could be justified only on the basis of the increased productivity. On completion, this project was to provide annual irrigation to about 0.6 million hectares. This could be accomplished through the construction of hundreds of miles of canals

and smaller irrigation channels. Fortunately, it was well-planned and efficiently created.

Left to their own resources and potentialities the local inhabitants and the new settlers would have taken a long time to develop the area and to derive the maximum benefit from available irrigation facilities. Multipurpose programme known as the Thal Development Project was, therefore, put into operation to arrange for proper utilization of irrigation facilities and to secure unhindered development of the area by streamlining and devetailing the programmes of different schemes like irrigation, road constructions, forestry, agriculture and colonization.

3. The Beginning

It was a gigantic task to create a multipurpose organization to achieve the desired results. Everything available had to be harnessed. Camels, donkeys, bullock carts and horsemen, vans and trucks etc. had to be mobilized. Gradually as land was levelled, water courses laid out, means of communication provided and houses built for the people to live in, the sting had been taken out of the vagaries of Thal desert. It took sometime for modern civilization to come there. The rigorous conditions of the tract required large-hearted men who never admit defeat. In spite of many difficulties and setbacks, however, the Thal came to have its appeal with the peasants, the workers and the business community. The first two years of war against shifting sand and consistent efforts to turn this tract into an agricultural land bore fruit in the third year; valuable experience had been gained about the behaviour of different food and cash crops and fruit and tree crops under the conditions obtaining in Thal. The man again proved his skill to successfully tackle the insurmountable problems through his ingenuity, skill and fortitude.

4. Use of Heavy Machinery

With out development of heavy earth moving equipment it would not have been possible to reclaim the dune infested land for agriculture. It was the first venture of its kind in the country. Hardly any experienced hands were available to undertake this exacting job on such a large scale. The programme was launched with the import of machinery from abroad. Soon the bull-dozers began to roll in the wilderness spreading out in the remotest corners and tearing apart whatever came their way. Machines were used not only for levelling the land and ploughing it but also for the construction of water courses.

5. Disturbance of ecological equilibrium (4,5)

The mechanical giants initiated the change in the ecological equilibrium which had perpetuated itself undisturbed for centuries. The wild vegetation was uprooted and cleared. The sand dunes were levelled, pushed back and given new forms and shapes. The animal life was greatly disturbed. The deer the rabbit, the sand grouse, snakes and other forms of life ran helter-skelter to find new abodes from their safe havens. Since the wild life had remained undisturbed in this part of the country for ages, the din and noise of the machines and the influx of settlers brought unbearable pressure on them. They became an easy pray to the poachers and wreckless shooters. Quite a lot of it just vanished. Instances were not uncommon when people killed the dazed quarries with jeeps and trucks. Bustard, sand grouse and gazelle

totally disappeared from the irrigated tract. Grey and black partridge and quails multiplied in the forest plantations and agricultural fields. Irrigated areas also attracted wild boar and hog deer which were formerly confined to the riverain tract only.

Irrigation facilities to Thal desert wrought a very significant change in the whole complex. New, well laid out villages with all possible facilities were created right in the heart of the desert to accommodate the settlers. Their spread-out disposition was a great contrast to huddled houses of the old villages. The roads were wide and straight. Bigger towns were constructed on the main lines of export of agricultural produce to facilitate timely transportation of goods to the markets.

6. Development of Agriculture

Since reclamation of desert in a planned manner was the first attempt of its kind in the history of Pakistan, the basic work, apart from other related activities embraced all aspects of agriculture. To test whether the methods of cultivation and fruit gardening in vogue could be applied under Thal conditions, demonstration farms and gardens were set up in the heart of Thal. The people of the area came to know for the first time in their life as to how mangoes, citrus fruits, guavas etc. could be cultivated. It was amply demonstrated that under irrigated conditions wheat, sugarcane, cotton, oil-seeds and fodder crops could be raised with great advantage. When the cotton and sugarcane production got boosted up, a natural corollary was setting up of textile and sugar mills. Quite a few of these were established within a short period of time.

7. Afforestation (5)

In order to provide fuel and timber to the settlers, a regional programme of afforestation was also put into operation. It was proposed to grow forests over an area of 60,000 ha. i.e. about 10% of the total area being developed under the Thal Canal Projects. A scheme for afforestation over a period of 20 years costing 5 million dollars was launched. It provided (a) compact blocks of forests to be known as national parks, over an area of forty thousand ha. (b) 40-ha village forests in every settlement blocks of 400 ha. These village plantations were to cover 18000 ha. and (c) establishment of shelterbelts of trees along water channels and roads over 2000 ha. Although the compact irrigated plantations had been started in the sub-continent for the last 80 years or so, formation of shelterbelts and village forests was to cater for immediate firewood and timber requirements of the settlers of a particular village and also to provide little bit of grazing and fodder. The shelterbelts were a necessity to protect the roads, water channels, agricultural fields and the fruit orchards from the ravages of shifting sand dunes and scorching sand storms. The afforestation campaign was one of the most successful one of its kind in the subcontinent and brought about a radical change not only in the landscape of the Thal but also significantly changed the climatic conditions. The plantations helped the farmers stabilise their lands and to get the added advantage of firewood, small timber and grasses.

The venture turned out to be the first ever programme of community forestry in the country. Nurseries of *Dalbergia sissoo*, *Morus alba*, *Acacia nilotica*, *Albizzia*, *Salmalia malabarica*

and *Tamarix aphylla* were set up within easy reach of the farmers. An additional extension effort was made by loading the planting material in trucks and delivering it at pick-up points. It was fully appreciated by the people that without tree belts which became effective barriers to check the movement of sand, neither the canals or small distributors would have run for the roads or railway tracks could have remained operational. As the years have passed by, the early settlers who planted trees on borders of their land and even tree rows in the agricultural fields to practise agro-forestry, are never tired of telling the others that they were able to recover their total investment on the purchase and development of land just by the sale of mature trees after 10–20 years of planting.

In addition, large scale sand dune fixation was also undertaken, *Calligonum polygonoides* and *Tamarix aphylla* branch cuttings were successfully planted with winter rains. Toes of the sand dunes were cained by digging a trench all around and planting xerophytic species such as *Acacia modesta* and *Prosopis cineraria*. After 6–10 years natural regeneration of the former species was seen on these sand dunes.

8. Livestock Management and Improvement

In spite of the facilities of irrigation, thousands of hectares were still uncommanded. These areas had to be put under some sort of use. The past pastoral economy of the tract gave a clue in this regard. It was decided to rear good quality livestock and use some of these lands for controlled grazing. Their feed was supplemented through cultivation of fodder crops in the irrigated lands. A livestock farm, spread over an area of 6000 ha was started. Advantages of planned animal husbandry became known to the people in due course of time. The farm was used as nucleus of studies on livestock development. Milk and milk products found ready market in the cities even hundreds of kilometers away. The livestock owners were provided all sort of help regarding treatment of their cattle and sale of pedigree stock for rearing in their own farms. Multiplication of imported sheep on a large scale led to the establishment of a big woolen mill producing carpets, blankets and a variety of woolen cloth.

9. Socio-economic impact (1, 2)

A most healthy effect was created on employment situation. Not only that an incentive was created for the people to work hard but suddenly there was tremendous scope of getting employment both as skilled or unskilled workers. Only the afforestation programme provided jobs to about five thousand people daily. The farms and gardens enabled them to learn the latest techniques in agriculture and fruit culture. The mills and factories did not mean a change only in the landscape, but also a social change. Thousands of jobless youth who used to while away their time in idle gossip or useless pursuits were provided employment. A large number of them learnt road and building construction techniques. All this put together brought a significant change in their standard of living, mode of life and general outlook.

Apart from the big town employment, an indirect beneficial effect of afforestation and agriculture production was the development of cottage industry. With the introduction of

mulberry in the irrigated plantations and farmlands the farmer took to the profitable past time of rearing silk worm and basket weaving. Merits of rural trade and craft were soon recognized. This enabled the farmer to supplement his income from agriculture. To give them a start, community manufacturing centres were opened where groups of villagers were trained. Necessary guidance and technical training helped job opportunities was halted as the youth started getting jobs close to their homes.

Education, medical facilities and social welfare are a very necessary accompaniment of any such venture. All these important aspects were taken due care of. The local population which had never thought of such facilities, got them at their door step. A chain of schools, dispensaries and hospitals was created to cater for the requirements of the population. All the amenities of modern townships such as electricity, water supply sewerage etc. were provided.

Only one single factor brought about the tremendous change; that is, the provision of irrigation. Had the canal project not been conceived or implemented the tract would have remained as barren, desolate and under-developed as it was forty years ago.

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