
Iron and the Debate on Second Urbanization

Ardhendu Ray¹

¹. Independent Researcher (Email: ray.ardhendu82@gmail.com)

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Abstract: *The present paper is an attempt to study the Iron and second urbanization in early historical India. It surveys previous researches and assesses the emerging new directions of a long debated topic. The main emphasis would be to acknowledge and understand how archaeological data provides new insights in this field.*

Keywords: Iron, Technology, Ganga Valley, Agriculture, Urbanization, Society, Chalcolithic

Introduction

The problem of the archaeology of Iron and its impact on urbanization has a long debated topic of early historical research in India. It has generally been argued that urbanization was caused by the rapid use of iron technology. It was first D. D. Kosambi (1965) who first ascribed the rise of urbanism in the sixth century BCE to the introduction of iron technology. He opined that extensive use of iron tools and implements such as plough led to the growth in agricultural production and the consequent increase in population. D. D. Kosambi and R. S. Sharma have emphasized the importance of economic factors and technological change in bringing about social transformation. Their formulations appear to have been derived from the influential idea of Childe (1936) that technological change brought in social change. R. S. Sharma argues that the focus of change in the sixth century BCE shifted from the upper Ganga plain to the middle Ganga plain. This area roughly corresponds to the Gangetic plains east of Allahabad and west of the Rajmahal hills (which he refers as a Majjhimadeśa). He contends that the alluvial plains combined with the heavy rainfall in this area are likely to promote thick vegetation. For a group to undertake agriculture such a landscape would require iron axes for clearing its dense forest (Sharma 2007). The hard clayey soil further requires iron plough shares to dig the fields for cultivation. Thus, the key to urban formation lies, according to these scholars, in the advanced iron technology, ensuring an agrarian surplus. This in its turn was essential for maintaining the non-food producing urban residents (Chakravarti 2011). The view of A. Ghosh is that iron technology was not a vital factor in clearing the forest and ploughing the alluvial soil in the Ganga valley. The copper and bronze tools were relatively effective

for these two purposes. The forests could have been cleaned also by burning it, as observed and recorded in the *Mahābhārata*.⁵ Sharma has also marshaled impressive data from the Pali canons and other sources roughly dating to the sixth-fourth century BCE to prove that iron implements were indeed being used. Discussing the origins of Buddhism, Sharma states that the iron plough was the single most important variable which transformed the tribal society.

He says, "Agriculture based on the use of the iron share, sickle, spade, etc. led to the production of surplus on a scale which could not be attained with stone or copper implements. This prepared the ground for the rise of urban settlements in North-eastern India around 500 BCE" (Sharma 2007).

Thus the stimulant for change is reduced to certain technological innovations, i.e. the changeover from the chalcolithic to the Iron Age. Iron axes and plough shares led to the production of surplus which in turn led to craft specialization and the emergence of various urban centres.

The problem of the Iron Age and its impact on society has been discussed by many scholars like A. Ghosh, and Dilip K. Chakrabarti. They emphasize the role of political authority in bringing about changes in the material culture of the society leading to the emergence of urban centres. Chakrabarti says:

"In fact a local agricultural base, an organized trade activity and a centralized political power structure went into the making of each of them (Rājagṛiha, Vārāṇasī, Kauśāmbī and Ujjayinī) as a city. Of these three factors primary emphasis should perhaps be given on the factor of political power" (Chakrabarti 1972-73).

N.R. Ray made the most significant contribution to the debate on the notion of the iron age by pointing out that up to the second century CE no iron ploughshare or iron axe had been reported so far from any of the Ganga valley sites (Ray 1975-76). He says, "This new agriculture and this new urbanization, the two together have been interpreted to have led to a new quickening of social impulses, which in their turn, gave rise to new social and economic forces...." (Ray 1975-76).

Ropar (Punjab), Jakheda (Uttar pradesh), Kauśāmbī (Uttar pradesh), and Vaiśālī (Bihar) are the four sites where Iron ploughshare have been reported so far. This insufficient account may speak of their limited presence and use during the age of the *mahājanapadas* (Chakravarti 2011).

Ghosh is of the view that the economic changes followed rather than preceded the establishment of the *janapadas* by various chiefs. He rejected the idea that introduction of iron inevitably lead to the beginning of urbanization. On the problem of surplus agricultural produce he says, "more than a surplus or even a capacity to produce surplus what is required is a socio political institution to force or induce the farmer to produce a surplus, to divert the surplus where it is required" (Ghosh 1973).

On the issues such as the formation of the *janapadas*, Ghosh (1973) gives a cautious note, "the establishment of the *janapada* itself was the result of the new society of the later Vedic age in which economic and political factors played their part with the former perhaps remaining in the background to boost up the latter" (Ghosh 1973).

However, this issue has not been dealt in detail and questions such as what were the new elements which led to the change from the relatively simpler lineage society (Thapar 1984) to a stratified state society eventually to the consequent rise of the urban centres.

In this regard, M. K. Dhavalikar's (1999) argument also very fruitful, as he suggested although dates of iron goes back to latter half of the second millennium BCE, urbanization took more six centuries to occur. Dhavalikar (1999) is of view that, this was largely occurred due to the adverse environment for a thousand years from about 1500 BCE or even earlier. There is a hiatus at several sites between the chalcolithic and the early historical levels as supported by radiometric dates and this has been compared with nuclear winter in Europe. It was a period of intense aridity almost all over the old world and particularly in India which is supported by Gurdeep Singh's palynological studies (Dhavalikar 1999). When mere human existence was difficult, there is no question of urban growth, in spite of their knowledge of iron technology, remained a rural folk for over half a millennium. But once the environment started becoming pleasant from 6th-5th century BCE, considerable progress could be made the rise of urbanism in that period (Dhavalikar 1999).

B. P. Sahu (2006) in his '*Iron and Social Change in Early India*', addressed "Social and economic implications of iron technology has created new categories of requirements, artefacts, and social groups, and this broadening of interest needs to be recognized as the most important contribution of the debate" (Sahu 2006).

Rakesh Tewari's (2014) recent research shows that the evidence of iron in pre-NBP phase has been well established in many excavated sites in middle Gangetic plain (Raj-nal-ka Tila, Lahuradewa, Malhar, Dadupur, Taradih, Chirand etc.) (Tewari 2010). A series of radiocarbon dates, stratigraphic and associated material attest its presence around 1300-1200 BCE at a good number of sites in almost all the areas in Ganga valley and its surrounding areas. More interesting is the evidence of iron ploughshare and sickle at Malhar (Tewari 2014) in the 18th-17th century BCE context, indicating that iron had begun to play a major role in agriculture. It also state here clearly that the introduction of iron technology, even the presence of agricultural tools, did not immediately bring about dramatic changes in material milieu leading to city formation.

In the light of above discussion, I have come to an understanding that iron is definitely one of the major factors that contributed to the emergence of second urbanization in the Ganga valley, but certainly not the only factor as it has been suggested by R. S. Sharma (2007). There is doubt that ultimately the iron technology was largely

responsible for the ushering in the second urbanization in India. But the most enigmatic aspect is that although the advent of iron now goes back to the latter half of the second millennium, urbanization took more than six centuries to occur (Dhavalikar 1999). There is a time gap between the introduction of iron technology and proliferation of the use of iron. First iron technology primarily helped production of weapons and war implements and subsequently in the manufacture of tools of production. The earliest date of iron goes back to c. 18th century BCE and at around 13th-12th century BCE there is an increase in sites yielding iron implements attests this fact.

Dhavalikar's environmental theory is also relevance in this context. As he said, "India enjoyed prosperity in the early historical period (600 BCE – 600 CE). This however, was not peculiar to India, but was more or less the case in many parts of the old world. This was the age of empires in Greece, Rome, Persia, China and India. A major factor responsible for this growth seems to be a favourable environment" (Dhavalikar 2002).

He further gives example of rainfall in different regions of India and it is clear that it was more than at present from Kauṭilya's *Arthaśāstra* (II.24) (Dhavalikar 2002). He also thinks that mud ramparts were embankments for flood protection (Dhavalikar 2002). Above all it can be said that not one but various factors, such as centralized power structure, increase in use of iron, and favourable environment, all contributed to the urbanization.

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