



Site Catchment Analysis with Special Reference to Hastinapur

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Site Catchment Analysis (SCA) is an important methodological approach in archaeology that seeks to examine the dynamic relationship between human settlements and the natural resources available within their surrounding economic territory. ¹The basic assumption of this approach is that human communities select settlement locations based on their ability to access and manage essential resources necessary for survival, economic activities, and long-term sustainability. By analyzing the spatial relationship between archaeological sites and their surrounding landscapes, site catchment analysis helps reconstruct patterns of resource exploitation, subsistence strategies, and environmental adaptation.²

¹ Vita-Finzi, C. & Higgs, E. S. (1970)

Prehistoric Economy in the Mount Carmel Area of Palestine: Site Catchment Analysis. Proceedings of the Prehistoric Society, 36, 1–37 — foundational article defining Site Catchment Analysis.

² Bailey, G. (2005)

Site Catchment Analysis, in C. Renfrew & P. Bahn (Eds.), *Archaeology: The Key Concepts* (pp. 230–235). Routledge — overview of SCA concepts and development.

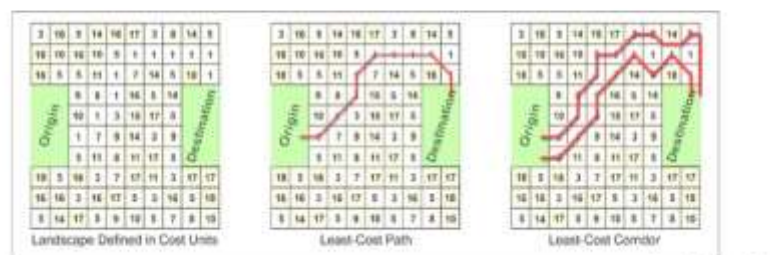


Least Cost Corridors

A Least Cost Corridor does not identify a single most cost-efficient route between two starting points, but indicates the **area of the least common costs** between two points.

That is, the lowest accumulative cost to reach starting point 1 **plus** the lowest accumulative cost to reach starting point 2 gives the total accumulative cost for a route that passes through a cell.

Least cost corridors can be used instead of a single least cost path to connect two sites and get the **optimal corridor for interaction** instead of a single path.



Source: Rubrick et al. 2012

The concept of Site Catchment Analysis was first systematically developed by Eric S. Higgs and Claudio Vita-Finzi during the late 1960s and early 1970s as part of the broader theoretical movement known as processual or New Archaeology.³ Higgs defined a site's catchment area as the economic territory surrounding a settlement from which its inhabitants procured essential resources such as food, raw materials, and water.⁴ This approach marked a significant shift in archaeological interpretation, as it moved away from purely cultural-historical and typological explanations toward a more scientific understanding of past human behavior

grounded in ecological and economic factors.⁵

Higgs and Vita-Finzi emphasized that prehistoric societies should be understood through their interactions with the environment, particularly in terms of how communities adapted to ecological constraints and opportunities. Rather than viewing archaeological sites in isolation, site catchment analysis situates them within a broader environmental context, highlighting the role of landscape, resource distribution, and human decision-making in shaping settlement patterns.⁶

Site Catchment Analysis is important because it provides insight into the functional relationship between settlements and their surrounding environment. It helps explain why a site was established at a particular location and how its inhabitants organized their daily activities to sustain life. Through the study of catchment areas, archaeologists can assess the economic potential of a settlement and understand the strategies employed to balance resource availability with population needs.⁷

Importance in Relation to Resources

One of the key contributions of site catchment analysis is its ability to identify the availability, accessibility, and distribution of natural resources within a defined radius of a settlement. These resources include water sources, fertile agricultural land, grazing areas, forests, and raw materials such as clay, stone, and timber.⁸ By mapping and analyzing these resource zones, archaeologists can reconstruct economic activities such as agriculture, craft production, and exchange networks. This

³ Legg, R. J. (2008)

"Catchment Analysis," in *Encyclopedia of Archaeology* (Deborah M. Pearsall, Ed.) — concise reference on SCA.

⁴ Roper, D. C. (1979)

The Method and Theory of Site Catchment Analysis: A Review. Advances in Archaeological Method and Theory — review of methodology, references Higgs's work on catchment areas.

⁵ Bailey, G. (2005)

Site Catchment Analysis, in C. Renfrew & P. Bahn (Eds.), *Archaeology: The Key Concepts* (pp. 230–235). Routledge — discusses the development and application of SCA following Higgs and Vita-Finzi.

⁶ Bailey, G. (2005).

Site catchment analysis. In C. Renfrew & P. Bahn (Eds.), *Archaeology: The Key Concepts* (pp. 230–235). Routledge.

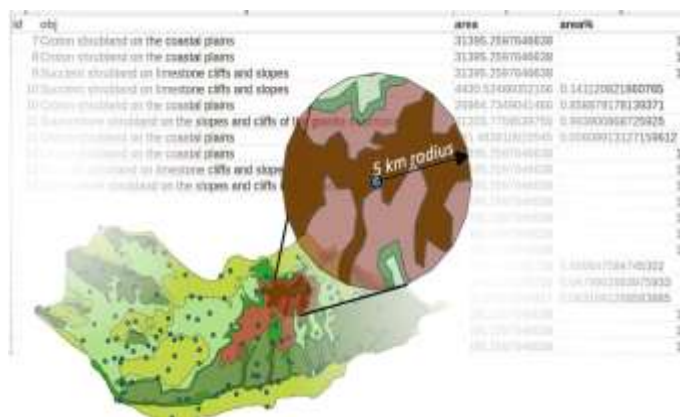
⁷ Renfrew, C., & Bahn, P. (2016).

Archaeology: Theories, Methods, and Practice (7th ed.). Thames & Hudson.

— Provides a clear explanation of settlement patterns, subsistence strategies, and economic organization using catchment analysis.

⁸ Roper, D. C. (1979).

The method and theory of site catchment analysis: A review. In *Advances in Archaeological Method and Theory* (Vol. 2, pp. 119–140). Academic Press.



approach also helps evaluate the trade potential of settlements and their degree of economic self-sufficiency or dependence on regional interactions.⁹

Importance in Relation to Environment

Site catchment analysis places strong emphasis on environmental factors such as river systems, soil types, climate, vegetation, and geomorphological features that influence settlement location and continuity. It highlights how communities adapted to environmental challenges such as floods, droughts, soil erosion, and landscape transformations.

In river-based settlements, particularly those in the Ganga plains, proximity to rivers offered fertile alluvial soils and reliable water supply, while simultaneously exposing settlements to the risk of flooding. SCA enables archaeologists to understand how such environmental opportunities and constraints shaped settlement planning and resilience.¹⁰

Importance in Relation to Subsistence

Another crucial aspect of site catchment analysis is its role in reconstructing subsistence strategies. By examining the spatial organization of agriculture, pastoralism, hunting, fishing, and gathering within the surrounding landscape, archaeologists can understand how communities secured food resources over time. The study of catchment areas helps explain patterns of seasonal movement, land-use intensity, and resource scheduling, thereby shedding light on how settlements achieved food security and long-term sustainability.¹¹

Site catchment analysis is a valuable methodological tool because it integrates settlement location with resources, environment, and subsistence strategies into a single analytical framework. By linking human behavior with ecological and economic contexts, SCA provides a holistic understanding of past human life and offers deeper insight into the adaptive strategies of ancient communities.¹² After theory, I would like to discuss , how the method was used in your country or region. In India, scholars have emphasized the close relationship between river systems and early settlements, particularly in the Ganga–Yamuna Doab.¹³

In India, the principles of site catchment analysis have been applied mainly through settlement pattern studies and ecological approaches, even when the term itself was not always explicitly used. Indian archaeologists have emphasized the close relationship between river systems, fertile plains, and human settlements, particularly in the Ganga–Yamuna Doab and other major river valleys.¹⁴

⁹ Higgs, E. S. (1975).

Palaeoeconomy. Cambridge University Press.

— Explores how access to land, water, raw materials, and grazing influenced prehistoric economic organization and self-sufficiency.

¹⁰ Conolly, J., & Lake, M. (2006).

Geographical Information Systems in Archaeology. Cambridge University Press.

¹¹ Bailey, G. (2005).

Site catchment analysis. In C. Renfrew & P. Bahn (Eds.), *Archaeology: The Key Concepts* (pp. 230–235). Routledge.

¹² Vita-Finzi, C., & Higgs, E. S. (1970).

Prehistoric economy in the Mount Carmel area of Palestine: Site catchment analysis. *Proceedings of the Prehistoric Society*, 36, 1–37.

¹³ Renfrew, C., & Bahn, P. (2016).

Archaeology: Theories, Methods, and Practice (7th ed.). Thames & Hudson.

¹⁴ Sharma, G. R., Misra, V. D., Mandal, D., & Misra, B. B. (1980).

Beginnings of Agriculture. Abhinav Publications, Allahabad.



Scholars such as **B.B. Lal** highlighted how access to perennial rivers, arable alluvial land, and nearby resources influenced the location and continuity of early settlements. Excavations in the Upper Ganga Plain revealed that settlements were strategically located to exploit agricultural land, water resources, and communication routes. Similarly, **R.S. Sharma** stressed the role of material resources and agrarian surplus in the development of early historic settlements.¹⁵

Dilip K. Chakrabarti made a significant contribution by integrating archaeology with geography. His studies on the archaeological geography of the Ganga Plain demonstrated that settlement distribution was closely linked to ecological zones, river dynamics, and soil fertility.¹⁶ He emphasized that long-term settlement continuity in northern India was possible due to the favorable environmental conditions within the settlement catchment areas.¹⁷

Regional studies of the Painted Grey Ware culture by scholars such as **Ramakrishna, R.C. Gaur**, and others revealed a network of closely spaced settlements, suggesting a hierarchical settlement system.¹⁸ Major sites functioned as central places, while smaller sites existed within their economic and ecological orbit. These studies indirectly support the application of site catchment analysis by highlighting how settlements shared and exploited surrounding resources.¹⁹

Overall, national and regional archaeological studies in India provide a strong foundation for applying site catchment analysis, even though systematic and quantitative SCA remains limited. These works emphasize the importance of environment, resources, and subsistence in shaping settlement patterns, particularly in river-based landscapes like the Upper Ganga Plain.²⁰

National and regional studies in India highlight the close relationship between river systems, environmental resources, and settlement patterns, providing a strong base for site catchment analysis.

After theory, discuss how the method was used in your country or region. Now narrow down to your specific site. Hastinapur has been extensively studied due to its archaeological and textual importance, especially after the excavations conducted by **B.B. Lal**.²¹

¹⁵ **Lal, B. B. (1954–55).**

Excavations at Hastinapura and Other Explorations in the Upper Ganga and Sutlej Basins. Ancient India, Nos. 10–11, Archaeological Survey of India.

¹⁶ **Chakrabarti, D. K. (2001).**

The Archaeology of the Ganga Plain. Permanent Black, Delhi.

¹⁷ **Chakrabarti, D. K. (1999).**

Archaeological Geography of the Ganga Plain: The Lower and the Middle Ganga. Munshiram Manoharlal.

¹⁸ **Ramakrishna, K. (1982).**

Excavations at Hastinapura: Painted Grey Ware Culture. Archaeological Survey of India.

¹⁹ **Allchin, B., & Allchin, F. R. (1982).**

The Rise of Civilization in India and Pakistan. Cambridge University Press.

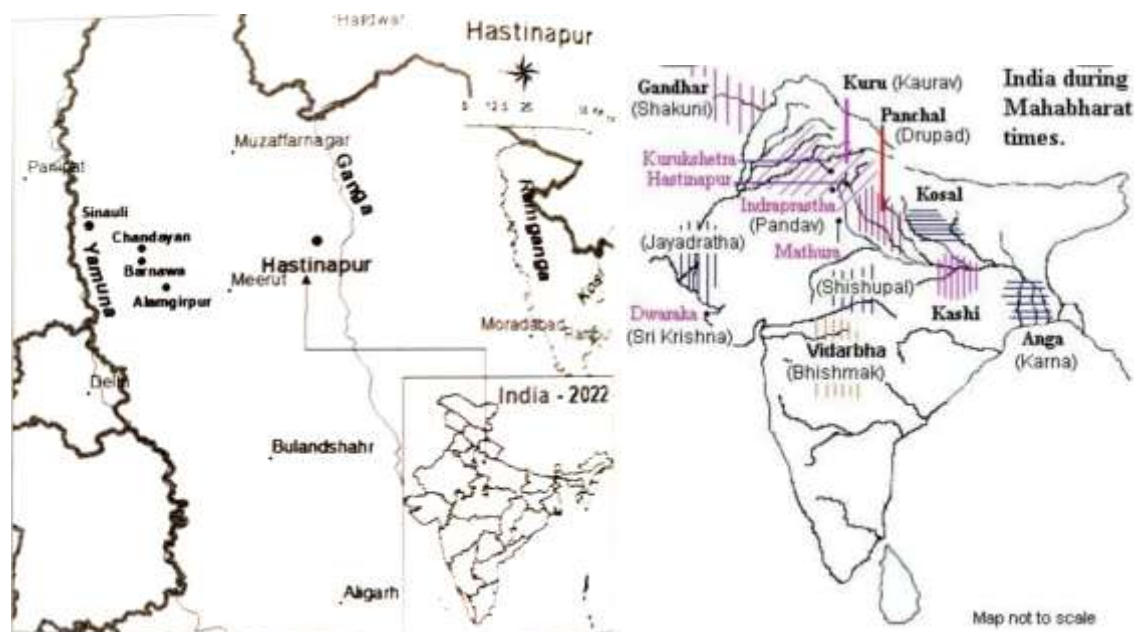
²⁰ **Chakrabarti, D. K. (2001).**

The Archaeology of the Ganga Plain. Permanent Black, Delhi.

²¹ **Lal, B. B. (1954–55).**

Excavations at Hastinapura: Painted Grey Ware Culture. Ancient India, Nos. 10–11, Archaeological Survey of India.

Literature on Hastinapur



Hastinapur has occupied an important place in Indian archaeological literature due to its historical, cultural, and textual associations with the Mahabharata and the Kuru kingdom. The most significant archaeological work at Hastinapur was carried out by **B.B. Lal** during 1950–52, which provided the first scientific understanding of the site.²² His excavations revealed a long cultural sequence beginning with **Ochre Coloured Pottery (OCP)**, followed by Painted Grey Ware (PGW), **Northern Black Polished Ware (NBPW)**, and early historic levels. This sequence established Hastinapur as a key site for understanding the transition from late prehistoric to early historic cultures in the Upper Ganga Plain.²³

B.B. Lal's excavation report also highlighted the role of environmental factors, particularly the impact of recurrent floods of the river Ganga. A thick flood deposit was identified above the PGW levels, which Lal interpreted as evidence for a major flooding event that led to the abandonment or relocation of the settlement.²⁴ This observation is crucial for site catchment analysis, as it demonstrates how natural forces influenced settlement continuity and spatial organization.²⁵

Subsequent scholars such as **Dilip K. Chakrabarti** and **R.C. Gaur** have examined Hastinapur within the broader framework of settlement patterns in the Upper Ganga Plain. Chakrabarti emphasized the importance of Hastinapur's location within a fertile alluvial zone, which provided access to water resources, cultivable land, clay for pottery production, and communication routes.²⁶ These studies suggest that the site's catchment area was rich in natural resources, supporting sustained human occupation.

Literature on the Painted Grey Ware culture places Hastinapur among a network of contemporary sites such as Atranjikhhera, Ahichchhatra, Kampil, and Alamgirpur. Scholars have argued that Hastinapur functioned as a major settlement within this

²² **Chakrabarti, D. K. (2001).**

The Archaeology of the Ganga Plain. Permanent Black, Delhi.

²³ **Ramakrishna, K. (1982).**

Excavations at Hastinapura: Painted Grey Ware Culture. Archaeological Survey of India.

²⁴ **Chakrabarti, D. K. (2001).**

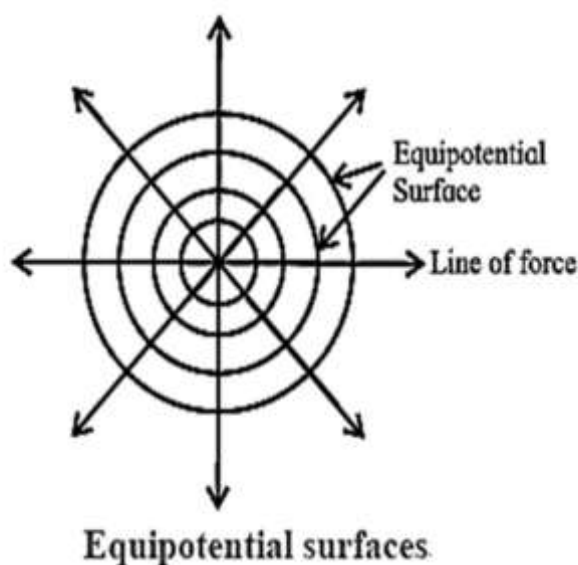
The Archaeology of the Ganga Plain. Permanent Black, Delhi.

²⁵ **Lal, B. B. (1997).**

The Earliest Civilization of South Asia: Rise, Maturity and Decline. Aryan Books International.

²⁶ **Gaur, R. C. (1992).**

The Painted Grey Ware Culture of the Upper Ganga-Yamuna Doab. Aryan Books International.



network, with smaller sites located in its surrounding region.²⁷ This hierarchical settlement pattern indirectly supports the relevance of site catchment analysis in understanding Hastinapur's economic and ecological role.

Although Hastinapur has been extensively discussed in archaeological literature, most studies focus on cultural stratigraphy, pottery typology, and textual correlations. Detailed and systematic application of site catchment analysis, particularly using spatial and environmental data, remains limited.²⁸ This gap highlights the need to re-examine Hastinapur through a site catchment approach to better understand its resource base, subsistence strategies, and environmental adaptation. The literature on Hastinapur emphasizes its cultural sequence and environmental

context, but lacks a systematic site catchment analysis.²⁹

Research Gap in the Study of Hastinapur

A critical review of the existing archaeological literature reveals that Hastinapur has been extensively studied from archaeological, cultural, and textual perspectives. Excavations, most notably those conducted by B.B. Lal during the early 1950s, have successfully established a clear cultural sequence at the site, ranging from the Ochre Coloured Pottery phase through the Painted Grey Ware culture and into the early historic period.³⁰ These investigations have firmly established Hastinapur as a key site for understanding cultural transitions in the Upper Ganga Plain. In addition, several scholars have emphasized the historical and textual significance of Hastinapur, particularly its association with the Mahabharata tradition and the Kuru polity.³¹

Environmental factors have also received attention in earlier studies. The role of the river Ganga and the impact of recurrent flooding events on the settlement history of Hastinapur have been discussed, especially in relation to cultural disruption and possible episodes of abandonment or relocation. These observations have contributed to an understanding of the environmental challenges faced by the inhabitants and their influence on settlement continuity.³²

However, despite these significant scholarly contributions, a major gap remains in the systematic analysis of Hastinapur's surrounding economic and ecological landscape. Most previous studies have concentrated on material culture, stratigraphy, ceramic typology, and historical interpretation, while the broader spatial context of the site has received comparatively little

²⁷ Singh, R. N. (1988).

Settlement Pattern and Rural Archaeology of the Ganga Plain. Manohar.

²⁸ Lal, B. B. (1954–55).

Excavations at Hastinapura: Painted Grey Ware Culture. **Ancient India**, Nos. 10–11, Archaeological Survey of India.

²⁹ Singh, R. N. (1988).

Settlement Pattern and Rural Archaeology of the Ganga Plain. Manohar.

³⁰ Lal, B. B. (1954–55).

Excavations at Hastinapura: Painted Grey Ware Culture. **Ancient India**, Nos. 10–11, Archaeological Survey of India.

³¹ Lal, B. B. (1997).

The Earliest Civilization of South Asia: Rise, Maturity and Decline. Aryan Books International.

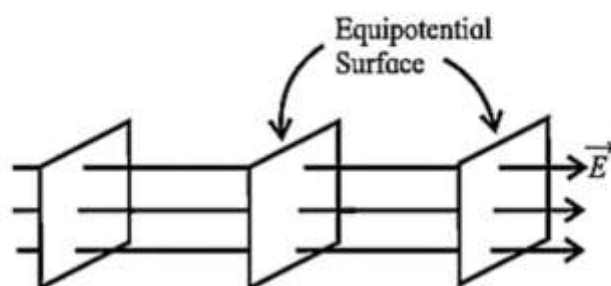
³² Allchin, B., & Allchin, F. R. (1982).

The Rise of Civilization in India and Pakistan. Cambridge University Press.



attention.³³ The distribution and accessibility of natural resources such as cultivable land, water sources, grazing areas, forests, and raw materials have not been comprehensively mapped or analyzed.³⁴

Although Hastinapur has been well excavated and historically interpreted, its surrounding resource zone has not been examined through a structured site catchment framework.³⁵ The principles of site catchment analysis, which integrate spatial, environmental, and economic data to understand settlement sustainability, have not been systematically applied to the site. As a result, the functional relationship between Hastinapur and its hinterland remains insufficiently understood.³⁶



Equipotential surfaces for a uniform electric field.

Furthermore, despite extensive archaeological work, the use of quantitative and spatial methods—such as analysis of land-use patterns, ecological zones, and communication routes within the settlement's catchment area—remains limited. This lack of integrated spatial analysis restricts our ability to fully understand how Hastinapur sustained long-term occupation and adapted to environmental constraints.³⁷

Thus, the primary research gap in Hastinapur studies lies in the absence of a systematic, spatially and environmentally integrated site catchment analysis. Addressing this gap is essential for moving beyond descriptive accounts and towards a more holistic understanding of Hastinapur as an economic and ecological system within the Upper Ganga Plain.³⁸

Identification of Research Gap in Hastinapur Studies

A critical review of the existing archaeological literature reveals that, despite extensive excavations and detailed cultural–historical studies, a systematic site catchment analysis of Hastinapur has not yet been undertaken. Since the pioneering excavations conducted by B.B. Lal in the early 1950s, research on Hastinapur has primarily concentrated on establishing its cultural sequence, ceramic typology, stratigraphic framework, and textual associations, particularly in relation to the Painted Grey Ware culture and the Mahabharata tradition.³⁹ These studies have successfully highlighted the historical and cultural significance of the site; however, they have largely treated Hastinapur as an isolated archaeological entity rather than as part of a broader ecological and economic landscape.⁴⁰

³³ Chakrabarti, D. K. (2001).

The Archaeology of the Ganga Plain. Permanent Black, Delhi.

³⁴ Lal, B. B. (1954–55).

Excavations at Hastinapura: Painted Grey Ware Culture. **Ancient India**, Nos. 10–11, Archaeological Survey of India.

³⁵ Higgs, E. S. (1975).

Site Catchment Analysis. *World Archaeology*, 7(2), 211–221.

³⁶ Ramakrishna, K. (1982).

Excavations at Hastinapura: Painted Grey Ware Culture. Archaeological Survey of India.

³⁷ Singh, R. N. (1988).

Settlement Pattern and Rural Archaeology of the Ganga Plain. Manohar.

³⁸ Higgs, E. S. (1975).

Site Catchment Analysis. *World Archaeology*, 7(2), 211–221.

³⁹ Gaur, R. C. (1992).

The Painted Grey Ware Culture of the Upper Ganga-Yamuna Doab. Aryan Books International.

⁴⁰ Lal, B. B. (1997).

The Earliest Civilization of South Asia: Rise, Maturity and Decline. Aryan Books International.



Most previous research has focused on material culture and intra-site stratigraphy, with limited attention given to the spatial distribution of natural resources surrounding the settlement. Critical aspects such as the availability of cultivable land, access to water sources, grazing areas, forest resources, and raw materials like clay and timber have not been systematically mapped or analyzed. As a result, the economic foundations that sustained long-term habitation at Hastinapur remain insufficiently understood.⁴¹

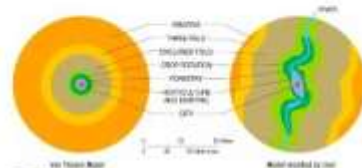
Environmental factors, particularly the role of the river Ganga and recurrent flooding events, have been frequently noted in archaeological interpretations. The identification of flood deposits above the Painted Grey Ware levels is often cited as evidence for settlement disruption or abandonment.⁴² However, these environmental observations have not been integrated into a structured spatial or ecological framework that examines how inhabitants adapted to environmental risks while continuing to exploit the surrounding landscape. The absence of such integration limits our understanding of human–environment interaction at Hastinapur.⁴³

Furthermore, earlier interpretations concerning settlement continuity, relocation, or abandonment have largely relied on stratigraphic and cultural evidence alone. These interpretations require re-examination through quantitative and spatial

methods, such as site catchment analysis, which can assess the extent and productivity of agricultural land, the distribution of water sources, communication routes, and the organization of subsistence zones within a defined catchment area. Without such analysis, explanations for the resilience or decline of the settlement remain incomplete.⁴⁴

SCA - Background

- Probably managed/used space at a given distance from the site
 - Resources used differ in relation to distance
 - Relative distance (in costs) might differ in relation to the topography
- Basic idea: von Thünen
- Size of the catchments derived from ethnographic data
 - typical:
 - close vicinity 1 km or 20 min walk: Horticulture or other high intensity activities
 - medium vicinity 5 km or 1 h walk: agricultural fields
 - far vicinity 25 km or 1 day walk: extensive activities, eg. herding



network, its functional role within this regional settlement hierarchy has not been examined through the lens of resource sharing, economic interdependence, and ecological zones.⁴⁵ A systematic site catchment approach could help clarify whether Hastinapur functioned as a central place supported by surrounding smaller settlements or operated as a self-sufficient unit.⁴⁶

⁴¹ Higgs, E. S. (1975).

Site Catchment Analysis. World Archaeology, 7(2), 211–221.

⁴² Gaur, R. C. (1992).

The Painted Grey Ware Culture of the Upper Ganga-Yamuna Doab. Aryan Books International.

⁴³ Chakrabarti, D. K. (2001).

The Archaeology of the Ganga Plain. Permanent Black, Delhi.

⁴⁴ Lal, B. B. (1954–55).

Excavations at Hastinapura: Painted Grey Ware Culture. Ancient India, Nos. 10–11, Archaeological Survey of India.

⁴⁵ Gaur, R. C. (1992).

The Painted Grey Ware Culture of the Upper Ganga-Yamuna Doab. Aryan Books International.

⁴⁶ Chakrabarti, D. K. (2001).

The Archaeology of the Ganga Plain. Permanent Black, Delhi.



Fig.: Hypothetical site catchment zones around Hastinapur showing access to resources, water sources, and subsistence areas

The above diagram represents a hypothetical site catchment model of Hastinapur, illustrating the spatial relationship between the settlement and its surrounding economic and ecological zones. Hastinapur is shown at the center, indicating its role as the primary habitation area, while concentric circles represent different catchment zones accessible through daily or seasonal movement.

The inner catchment zone, extending up to approximately 5 km from the settlement, represents areas used for intensive daily activities such as agriculture, water collection, pottery production, and domestic resource procurement. The fertile alluvial soils near the river Ganga would have supported agricultural activities, while nearby clay sources facilitated ceramic production, particularly during the Painted Grey Ware and early historic periods.

The outer catchment zone, extending up to 10 km or more, includes grazing areas, forest resources, and additional agricultural land. These zones were likely used for pastoral activities, fuel collection, timber procurement, and seasonal exploitation of resources. The river Ganga, marked prominently in the diagram, functioned as a crucial water source, communication route, and provider of fertile floodplain soil, although it also posed challenges such as flooding.

The diagram highlights how Hastinapur was strategically located to balance access to essential resources while adapting to environmental constraints. It visually demonstrates the principles of site catchment analysis by linking settlement location with subsistence strategies, environmental factors, and resource utilization. Such a spatial representation helps move beyond



site-specific excavation data and enables a broader understanding of Hastinapur as an integrated ecological and economic landscape.

Thus, what is notably missing in Hastinapur studies is a comprehensive, spatially integrated site catchment analysis that brings together environmental data, resource distribution, land-use patterns, and subsistence strategies within a single analytical framework. Such an approach is essential to move beyond descriptive archaeology and towards a more holistic understanding of Hastinapur as a dynamic ecological and economic system.⁴⁷ A re-assessment of the site through site catchment analysis would not only refine existing interpretations but also contribute significantly to broader debates on

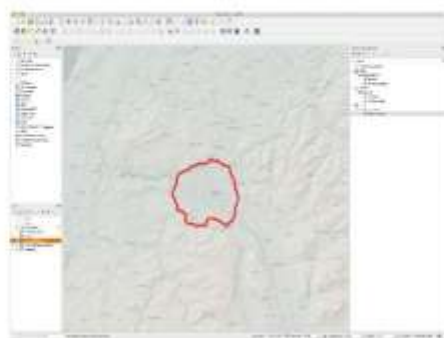
settlement sustainability and human–environment interaction in the Upper Ganga Plain.⁴⁸

Relevance of the Present Study

A critical review of earlier scholarship demonstrates that Hastinapur has been studied extensively from archaeological, cultural, and historical perspectives. Excavations and regional surveys have successfully established the cultural sequence of the site, documented its material remains, and explored its textual associations, particularly in relation to the Painted Grey Ware culture and early historic traditions of the Upper Ganga Plain.⁴⁹ These studies have firmly positioned Hastinapur as an

SCA - What do we need

- an estimation of the catchment (we just did that)
- data on resources, which can come as
 - Raster: DEM, Slope, Aspect, Distance to Water, ...
 - Vector: Soil Types, Water Bodies, location of specific resources, ...
- What we might get out: Percentages of area with specific environmental values



13/12

Catchment of 10 km around Ben

important settlement within the regional cultural framework and have drawn attention to environmental factors, such as the dynamics of the river Ganga and recurrent flooding, in shaping its settlement history.⁵⁰

However, despite these significant contributions, much of the existing scholarship has remained largely descriptive and site-centered. Previous research has focused primarily on stratigraphy, ceramic typology, and historical interpretation, while the broader economic and ecological landscape within which Hastinapur functioned has not been systematically examined.⁵¹ The spatial organization of natural resources, land-use patterns, subsistence zones, and communication networks surrounding the site has received limited analytical attention. Consequently, the functional relationship between the settlement and its surrounding environment remains insufficiently understood.⁵²

⁴⁷ Ramakrishna, K. (1982).

Excavations at Hastinapura: Painted Grey Ware Culture. Archaeological Survey of India.

⁴⁸ Gaur, R. C. (1992).

The Painted Grey Ware Culture of the Upper Ganga-Yamuna Doab. Aryan Books International.

⁴⁹ Lal, B. B. (1954–55).

Excavations at Hastinapura: Painted Grey Ware Culture. **Ancient India**, Nos. 10–11, Archaeological Survey of India.

⁵⁰ Higgs, E. S. (1975).

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⁵¹ Singh, R. N. (1988).

Settlement Pattern and Rural Archaeology of the Ganga Plain. Manohar.

⁵² Gaur, R. C. (1992).

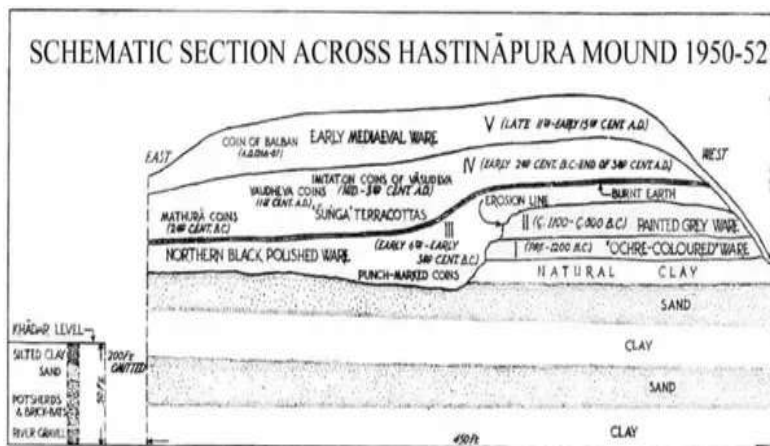
The Painted Grey Ware Culture of the Upper Ganga-Yamuna Doab. Aryan Books International.

Site Catchment Analysis (SCA)

- Used to estimate how many resources were available per (settlement) site within the catchment area
- Practical approach:
 - Defining the catchment area
 - Defining indicators for resources
 - Calculation of the available proportion/quantity
- Typical surveyed factors:
 - Soil types
 - soil quality
 - Slope inclination
 - humidity
 - (Climatic factors)



In this context, the present study assumes particular significance as it seeks to bridge this critical gap in the existing literature. The literature review has been structured to provide a clear and logical progression: it begins with a discussion of the theoretical foundations of site catchment analysis, followed by an examination of global theoretical contributions.⁵³ It then moves to national and regional archaeological studies in India, highlighting how ecological and settlement pattern approaches have implicitly reflected site catchment principles. The review subsequently narrows down to site-specific studies on Hastinapur, critically evaluating the contributions and limitations of previous scholars.⁵⁴



Through this critical engagement with existing literature, the study identifies the absence of a systematic and spatially integrated site catchment analysis of Hastinapur as a key research gap.⁵⁵ Finally, by establishing the relevance of the present research, the study proposes to move beyond descriptive accounts and apply site catchment analysis to understand Hastinapur as an ecological and economic landscape. In doing so, the present work aims to offer a more holistic interpretation of settlement dynamics, resource utilization, and human–environment interaction in the Upper Ganga Plain.⁵⁶

⁵³ Allchin, B., & Allchin, F. R. (1982).

The Rise of Civilization in India and Pakistan. Cambridge University Press.

⁵⁴ Lal, B. B. (1954–55).

Excavations at Hastinapura: Painted Grey Ware Culture. *Ancient India*, Nos. 10–11, Archaeological Survey of India.

⁵⁵ Higgs, E. S., & Vita-Finzi, C. (1972).

Prehistoric Economy in the Mediterranean Basin: A Study of Resource Use. Thames & Hudson, London.

⁵⁶ Farrington, I. S. (1980).

Archaeological Perspectives on Resource Use and Settlement Systems. Academic Press, London.