Charmeleons: The Agrarian Practice on a Brahmaputra Island

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Introduction

Agriculture is one of the oldest forms of human activity and has a significant impact on human life. It is characterised by the production of food and can have a supporting role in the conservation of ecosystems. However, the positive impact of agriculture on the environment depends on the type of agriculture being practiced. While conventional agriculture, with its reliance on chemicals and monoculture farming, can have negative impacts on the environment, such as soil degradation, water pollution and biodiversity loss, agroecological practices can help to mitigate these impacts and promote biodiversity. Agricultural practices can differ depending on location, environmental conditions and culture. Especially in countries of the Global South such as India, agriculture is of great importance and shapes not only the culture, but also the social and political life.

Assam, located in the north-east of India, is an important agricultural state known for the production of rice, tea, cotton, jute and sugar cane. The state owes its fertile soils and tropical climate not least to the mighty Brahmaputra, one of Asia's longest rivers, which runs through Tibet, China, India and Bangladesh. The river is known for its periodic floods and seasonal changes, which influence agricultural practices in the river basin area. The local hydrological and geomorphological conditions

cause the occurrence of river islands, also known as "chars". The term char comes from Bengali and means land rising from the riverbed. They are formed by the accumulation of sediments, which under certain conditions can develop into unique ecosystems over time. Thus, chars are special environments because they challenge the classical geographical understanding of land and water as dichotomous structures. Since the dividing lines between land and water are blurred on river islands, they can legitimately be described as hybrid environments. They are also hybrids from a cultural-ecological perspective, because culture on the chars is closely intertwined with nature.

The alluvial soil on the islands is particularly fertile, leading them to be considered important agricultural areas. At the same time, agricultural practices on the river islands differ considerably from those on the mainland and are adapted to the specific conditions. From these points of view, the chars are an interesting area of research to gain a better understanding of agricultural practices in this unique region. In our study, we examine the structure of agrarian practices on the char Rani Chapari in Guwahati/Assam. During two weeks of field research, qualitative interviews were conducted with relevant actors involved in the char's agriculture, including farmers, labourers, middlemen and market traders. The findings from the interviews are presented in this paper and visually supported with geographical data collected in the field.

In a first step, the formation of the river islands is explained, taking into account the geomorphological and ecological conditions. In addition, the study area around Rani Chapari Island is presented. Secondly, an overview of the state of research is given in order to derive the theoretical relevance of this research with a research-guided question. Following from this, the analytical and methodological framework for answering the research question is illustrated. Here, challenges in data collection are pointed out as well. Then, the results are presented and discussed in a canalised manner within the three areas of land, labour and market. Finally, a summary of the results including an outlook is given.

It will be shown that agricultural practice on Rani Chapari Island consists of complex structures that are dynamically interconnected and influence each other. Therefore, the holistic approach of this study proves to be suitable for understanding the structure of agrarian practice on a char.

Geomorphology of research area

Looking at the geomorphic and ecological conditions of chars, the dichotomy of land and water can be challenged. In these microcosms, the strict differentiation proves to be extremely difficult because the dividing lines between land and water blur together. The concept of hybridity can help to gain a better understanding of the formation as well as the dissolution of the river islands. In addition, the fluvio-geomorphic conditions are important fundamentals that are crucial in the interaction between humans and the environment (cf. Lahiri-Dutt & Samanta 2013, 7-8). Therefore, we understand chars as hybrids between land and water as well as culture and nature.

The history of chars in India and Bangladesh begins in the Eocene when the Indian plate collided with the Burmese plate about 34 million years ago and began to slide under it. This event created the mountain belt of Assam and Arakan and the Bengal Basin on its eastern side in the Pliocene. Due to the newly formed geography, the Brahmaputra has formed a special river valley in Assam (cf. ibid., 36). With a total length of 680 km and an average width of 8-10 km, the Brahmaputra in the Assam Valley is fed by 32 tributaries with an enormous sediment volume and provides optimal conditions for the formation of river islands or sandbanks (cf. Bhagabati & Deka 2022, 144-45).

Map 1, Brahmaputra River Basin in the Assam Valley (Google Maps 2023).

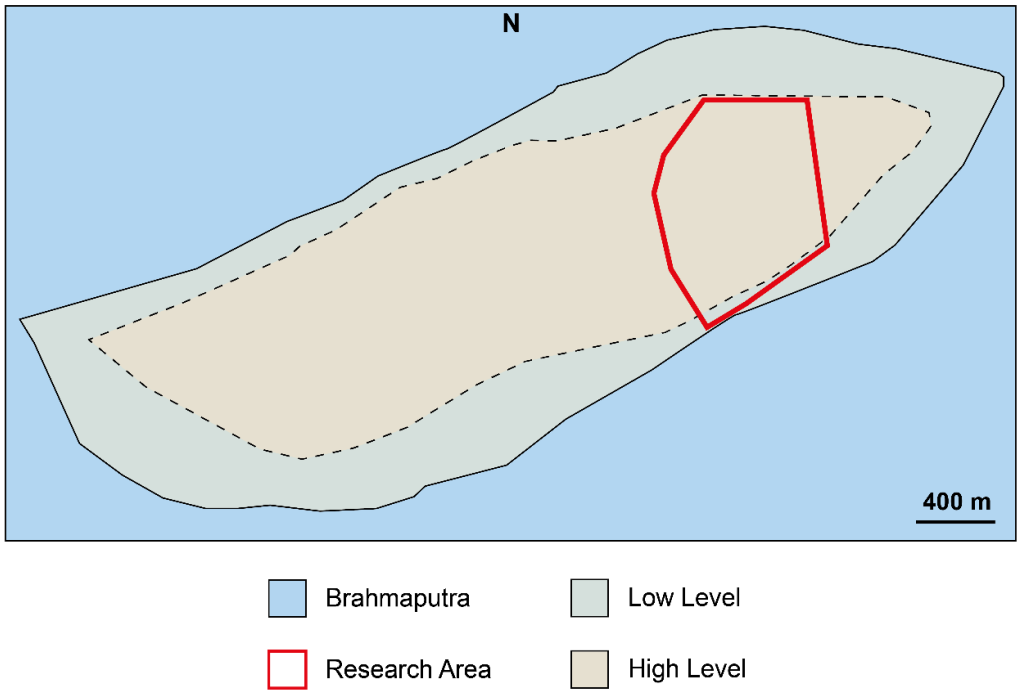
Basically, chars are formed by the alternating process of sedimentation and accretion, whereby various fluvio-geomorphic features are significant in Assam. First and foremost, seasonal variability has a major

influence. While the river flow is weak in winter due to low rainfall and favours sediment deposition, the monsoon rains increase the discharge in the summer months (cf. Lahiri-Dutt & Samanta 2013, 9). This fluctuation is also intensified by the freezing and melting processes in the Himalayan mountains. Furthermore, the slope also has an influence on runoff. While the gradient in the state of Arunachal Pradesh is very steep, the slope between Neematighat and Dhubri is very slight at about 10 cm per 1 km and ensures that the sediment load cannot be carried by the river (cf. Bhagabati & Deka 2022, 148).

Sandbanks and river islands lead to a braided river pattern and further widen the river. The deflection of river flows removes additional sediments from the erodible banks, thus enhancing the formation of the chars. The dynamic processes of erosion, sedimentation and accretion are due to the geological characteristics of the Brahmaputra valley in Assam, where alluvial soil types are common. There are two types of alluvial soil in the region—old and young alluvium. The majority of the chars consists of the younger alluvium. Chars whose elevation exceeds the average flood level are characterised by a layer of silt and clay above the sandy surface. Gradual growth of this layer towards the surface causes finer sediments to accumulate on top, resulting in a vertical gradation of particles from coarse to fine (cf. ibid., 145-46). This layer favours the growth of different types of vegetation and promotes the emergence of a unique ecosystem on the river islands.

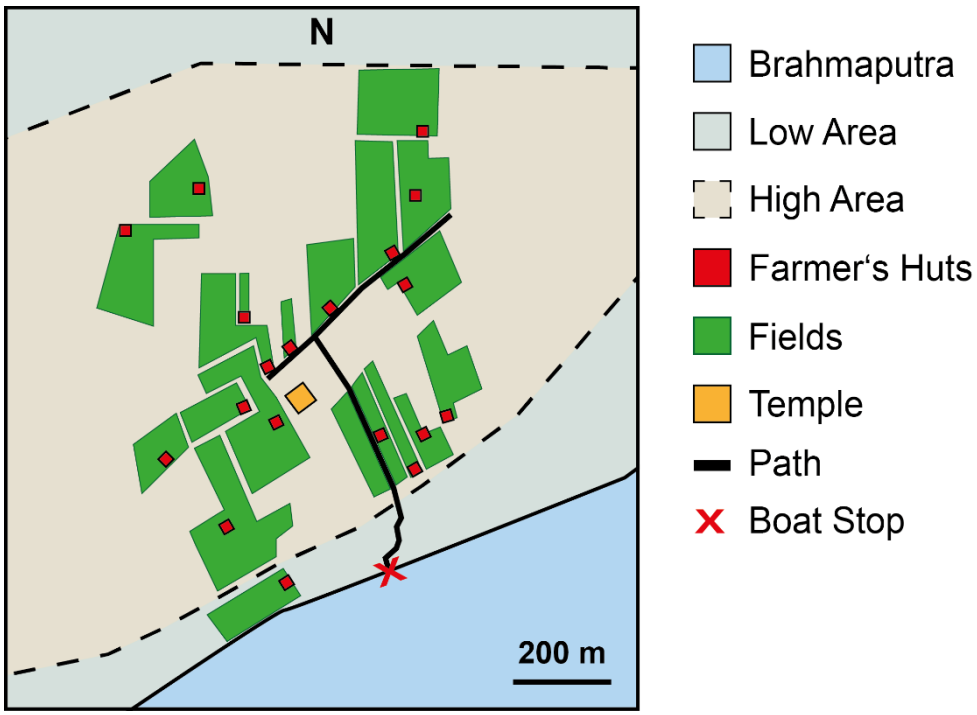
Unless the newly created land does not erode, the first vegetation to develop is the growth of grasses, such as the "*Kohua*" (Assamese for "Saccharum spontaneum"), which is typical for north-eastern India. The root system of these grasses gives the soil stability, accelerates the deposition of sediments during floods and adds humus to the soil when it decomposes (cf. Sarker et al. 2003, 70). Seeds, shoots and roots of various plant species are also transported to the river islands by the floods (cf. Bhagabati & Deka 2022: 152). Besides the natural emergence, vegetation is also promoted by char cultivators who have planted (fruit) trees for their own use or as windbreaks. Through these processes, sandbanks can develop into ecosystems with unique flora and fauna that contribute to the longevity of the river islands. However, for a char to reach this stage is not given. Because as quickly as chars can rise from the riverbed, they can also disappear again. In this context, during our research trip we were able to observe how a sandbank near Rani Chapari, which was formed about 2 years ago, was about to collapse due to numerous erosions. A distinction is therefore made between permanent (10 years or older), semi-permanent (between 5 and 10 years) and temporary (less than 5 years) chars (cf. Kumar & Das 2019, 92).

Rani Chapari itself was created over 250 years ago and therefore belongs to the category of permanent chars. The 675-hectare island[1] is located north of the riverbank of Dharapur, a western district of Guwahati/Assam. It was settled after the partition of India by Assamese farmers in the 1950s, is not inhabited and used exclusively for agricultural purposes. As typical for permanent chars, Rani Chapari is characterised by a higher and lower plain (about 1.5 metres difference). While the higher level is mainly used for agriculture due to less frequent flooding, the lower level is largely used for grazing livestock, although a few fields can be found here as well. An illustration of the broad research area is given in Map 2.



Map 2, Rani Chapari Island and Research Area (Own illustration with Google Maps 2023).

For our research, we have limited ourselves to the eastern part of the island. Focusing on a specific area ensures the feasibility of this study and should increase the quality of the evaluation by allowing for a precise investigation. Also, potential interactions between farmers can be better interpreted due to the spatial proximity. In order to provide a visual framework for the results and facilitate a better understanding of the studied context, a detailed look at the specific research area is illustrated in Map 3.



Map 3, Specific Research Area on Rani Chapari Island (Own illustration with Google Maps and GIS 2023).

State of the art

The literature on chars touches on numerous socially relevant topics such as colonialism, migration, vulnerability, livelihoods and climate change. In the following, we provide an overview of the state of research and demonstrate the relevance of our work. We also identify a research gap that our study addresses and provides its theoretical relevance.

For conceptual understanding, Lahiri-Dutt and Samanta's (2013) description of chars as hybrid environments is formative because they challenge 'a number of naturalised concepts and categories, not just the nature/ culture divide, but also the land/water dichotomy' (3-4). The researchers present two perspectives on hybridity: Chars are neither 'fully land nor can they be described as water,' as the boundary between land and water is blurred. Moreover, they can be seen as 'borderless worlds' in which borders are no longer defined as 'fixed lines on the ground' but as 'negotiated spaces or zones' (ibid., 7-8).

Following on from this, chars are also the results of colonial and post-colonial human interventions. With the aim of taming "wild" nature through river regulation measures, colonial powers imported a capitalist worldview into India and 'transformed them into areas of human habitations by importing mostly Muslim agricultural labourers from East Bengal' (Nayak & Panda 2016, 25). In the wake of communal conflicts caused by the partition of India in 1947, migration gained a new momentum and promoted the settlement process by Bengali refugees

(cf. Bhagabati & Deka 2022, 154). However, migration within inhabited chars through continuous erosion and flooding is by no means a historical phenomenon. In their research, Kumar and Das (2019) identified six factors that influence migration, including 'land owned by the household, land lost by the household due to erosion, household size, job opportunities at the site of immigration, dependency ratio and location of the household' (93).

The migration background makes char dwellers vulnerable because they are marginalised and illegalised. In the literature, both external (environment) and internal (human) facets of vulnerability are discussed. Besides floods and erosion, 'illiteracy, geographical isolation, physical inaccessibility and lack of proper endeavour' are described as important factors (Bhagabati & Deka 2022, 144). Gender is also discussed as an aspect in the literature (cf. Hossain & Rahman 2021, 408-409), whereas caste and religion play a minor role due to the lack of a diverse cultural landscape on the chars (cf. Bhagabati & Deka 2022, 156). In order to sustain their livelihoods despite vulnerability, while increasing their resilience to shocks, farmers pursue various adaptation strategies. At this intersection, Hossain and Rahman (2021) bring the concept of social capital into the debate, explaining that 'community assistance can be critical in coping with floods with regard to [social] capital' (399). Furthermore, the researchers identify a positive correlation between the long-term adaptive capacity of char farmers and their educational qualifications (ibid., 415). In contrast, Lahiri-Dutt and Samanta (2013) focus on short-term strategies and describe how farmers can make a living through agriculture, marketing the produce, wage labour, rearing livestock, informal trading and fishing (cf. 150-68). With the diversification of assets and income, a basic strategy emerges to compensate potential losses due to uncertainties.

Overall, the river islands of the Brahmaputra have received little attention in research so far. Bhagabati and Deka (2022) emphasise that 'although the charlands of the Brahmaputra bear immense significance from cultural and fluvio-geomorphic points of view, in depth studies on them are still rare' (144). It turns out that existing research on chars is oriented towards two aspects: First, the studied islands are exclusively inhabited chars. Second, there is a substantive focus on migration and colonialism, as well as vulnerability and livelihoods. Although these studies provide important insights into the living realities of char dwellers, some aspects have not been investigated in depth so far. A central aspect on inhabited as well as uninhabited chars is agriculture, which is still the most important source of income for farmers today. The lack of a profound analysis of agricultural practices and the focus on an

uninhabited char forms a research gap that we are addressing with our field research on Rani Chapari Island. In doing so, our research-guided question is:

How is the agrarian practice structured on Rani Chapari Island?

A deep understanding of the agrarian practice can provide insights into production systems, labour hierarchies as well as socio-economic relations within the agricultural market and gives this work its theoretical relevance.

Framework

Analytical framework

In order to guide our research on the agrarian practice, we used the concepts of land, labour and market from "Critical Agrarian Studies" as this allows for a holistic view (cf. Akram-Lodhi 2021; Pattenden 2021; Jan & Harriss-White 2021). In addition, we have been inspired by Lahiri-Dutt and Samanta's (2013) concept of hybridity (cf. 7-9). Based on our understanding of chars as hybrid systems that are inseparable from land, water and cultural perspectives, a picture of mutually influencing relationships emerges. Accordingly, land, labour and market are likewise conceptual approaches that relate to each other through the hybridity of char as a basis for investigation. An overview illustrating our analytical framework, can be seen in Figure 1.

For each of the three areas of investigation, we have in turn developed an overall question and decoded them into further sub-topics to channel our research. With the first pillar, we look at the perspective of land on Rani Chapari Island. In order to examine the structure of production related activities, we look at land relations from two perspectives. At first, there is the changing territory and its land-water hybridity. Since the char is an ever-changing alluvial area, agricultural practices on fluvial soils need to be specifically examined. This raises questions about cropping patterns (cultivation) on these hybrid formations and how farmers adapt to changing conditions (crisis management). Secondly, we look at the area of culture-nature hybridity and how land is divided (land rights) on Rani Chapari. In the labour perspective, we investigate the organisation of labour. Special attention is paid to the different actors on the char, labour conditions, hierarchies and the organisation among them. Finally, the focus on the integration of production into the agricultural market of Guwahati completes our analytical framework. In this context, we are particularly interested in the aspects of sales opportunities, market actors and their agendas, as well as the farmers' scope for action in the market economy.

Addressing these subtopics in practice provides a comprehensive understanding of the agrarian practice on Rani Chapari Island and enables us to answer our guiding question.

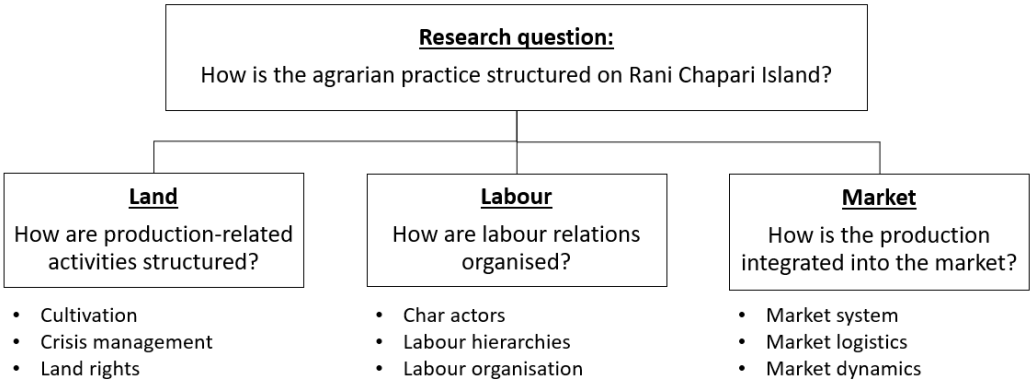


Figure 1, Analytical framework (Own illustration 2022).

Methodological framework

In order to make our theoretical analysis structure observable and therefore evaluable, a corresponding methodological framework is required. Basically, we conducted 30 semi-structured interviews with actors of the char. This includes farmers, labourers, middlemen and market traders. Our findings are largely fed by the overall impressions of these conversations. However, in some cases reference is also made to specific interviews.

Concerning the empirical survey through open interviews, it is noteworthy that we engaged in casual conversations with the local people, enabling us to gain insights into the situation on the ground and identify relevant research questions. Using a semi-structured guide allowed us to incorporate new perspectives we had not considered before without deviating from our basic structure. In order to record the findings from the interviews, field notes were taken throughout the research. As an additional method to illustrate our results, geographical data of the research area was collected and analysed using GIS (see Map 2-4).

Finally, two challenges of our research need to be considered for the interpretation of our findings. First, the interviews were translated by third parties due to language barriers. Secondly, the findings on middlemen and workers are limited to a small sample of respondents and cannot be generalised to the broader research context.

By conducting qualitative interviews, writing a field diary, daily group reflections as well as mapping, we collected insightful data to feed our analytical framework and lead to the following evaluation.

Findings

The following chapter presents the results of the study, which are divided into three main areas: Land, Labour and Market. In each section, the relevant findings on the respective topic are discussed. The Land section discusses the unique environmental conditions of the island and the way they influence agricultural practices. The labour section focuses on the social organisation of labour and the role it plays in the community. Finally, the market section explores the complex dynamics of the agricultural market in Guwahati and the strategies farmers use to navigate this difficult terrain. In addition, the findings are discussed in light of the existing literature and the specific context of the study.

Land

A crucial factor for agricultural production on the chars is the availability and use of the limited land, which is influenced by natural and human factors. With regard to the land perspective, three aspects stand out on Rani Chapari: cultivation practices, crisis management and land rights.

As Assam is located in the subtropical climate zone, warm to hot temperatures dominate throughout the year, enabling year-round agricultural use. There is no classical seasonal cultivation as known from Central Europe. However, between May and October there is the monsoon season, which has a great influence on the cultivation cycles of the fields on the char (see Figure 2). The summer season during the monsoon season is called Kharif (from July to October). Due to the high rainfall figures during the monsoon of over 300mm per month (see Figure 3), crops with high water demand and resistance to floods are mainly cultivated during this period. Rice is the main crop here, but also various types of pumpkin. However, since many crops do not grow during the monsoon season, Kharif is the low season.

The main season is called Rabi and takes place during the much drier winter months from October to March. During this period, aubergines, okra or mint are grown, among other things. There are also crops that grow independently of the season. In general, the farmers on Rani Chapari rely on mixed crops in their cultivation. This means that they always cultivate a variety of crops that are growing at the time. This is interesting because the different products have different prices. For example, since the climatic conditions and the fertile soil of the chars provide particularly good conditions for comparatively demanding mint, the chars are one of the few places in the region where it is grown at all. As a result, mint is a relatively valuable crop and brings in correspondingly higher profit margins. Nevertheless, the farmers did not specialise in the cultivation of mint. This strictly diversified product

cultivation can be explained in two ways. On the one hand, the farmers secure themselves financially through their diversification in product cultivation, as they are therefore less dependent on price fluctuations of individual products. On the other hand, a mindset of profit optimisation was revealed to be less important in this context than the basic cultural understanding that has been passed down through generations as an essential factor in the diversification of the farming pattern.

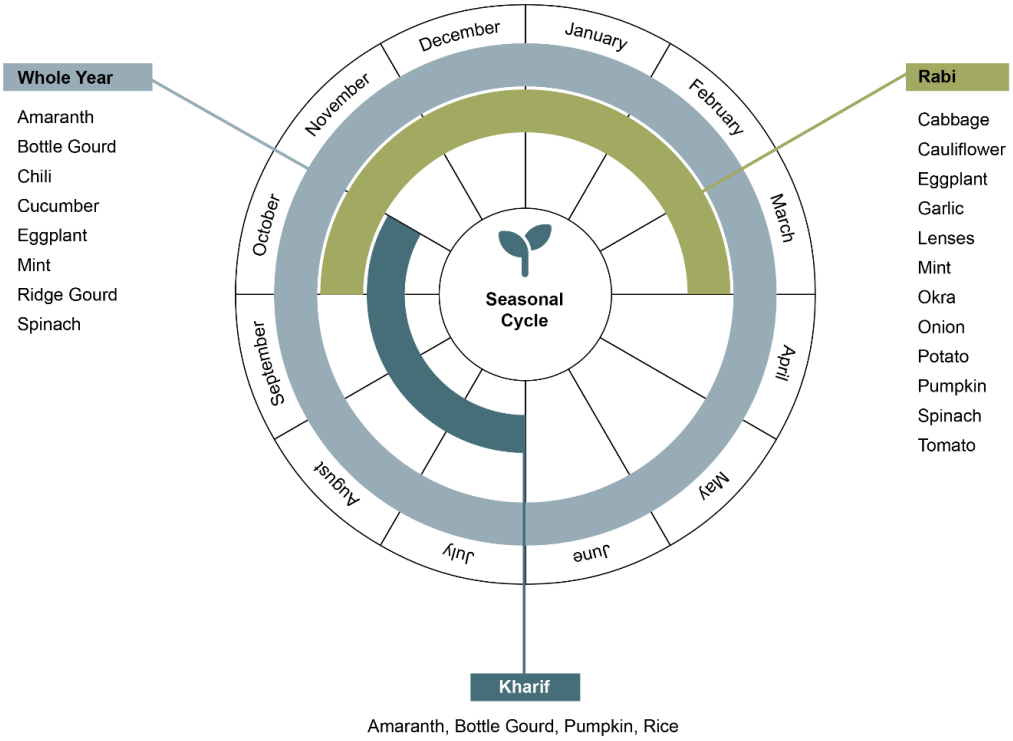


Figure 2, Seasonal Cycle Model (Own illustration 2023).

The tilling of the fields follows a clear sequence: After the harvest, the soil is cleaned and ploughed, then fertilised and prepared for new planting. Seeds are sown and the plants are cared for, including the use of fertilisers and pesticides as needed. Finally, the harvest takes place. Furthermore, the size and structure of the field may differ depending on the crop. The irrigation of the fields is also systematic. For example, the respective field borders are slightly elevated, creating a water barrier. In addition, furrows run parallel to the plants. This allows the fields to be flooded for irrigation in a controlled and uniform manner. The water comes from water pumps that can be found all over the island. The original models are hand-operated pumps. In the meantime, however, the farmers also have a total of 35 electrically operated water pumps. Electricity is generated by installed solar panels in order to pump the groundwater to the surface by means of negative pressure and thereby make it usable. Large water pipes are then used to transport and distribute the water to the fields.

As the river location in combination with the regular extreme weather events during the monsoon phases results in a vulnerable space for socio-economic practices such as agricultural production, the actors on the char have to adapt accordingly. One objective of the research was to identify farmers' adaptation strategies as part of their crisis management. The crises here refer to erosion processes and flood events due to the monsoon in northeast India. Rainfall is intensified by the relief rainfall (see Figure 3). The water level of the Brahmaputra also rises due to summer melt water from the northern Himalayas. Rani Chapari Island is regularly flooded due to its river location, which can increase soil fertility through sediment deposition. However, strong floods lead to destruction of fields and crop losses.

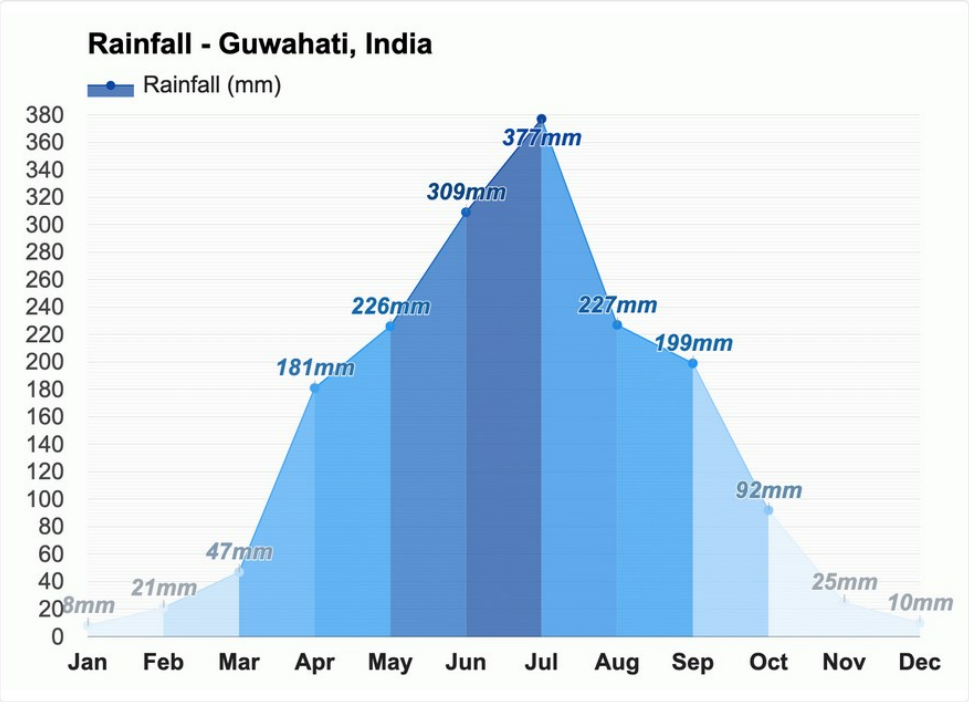


Figure 3: Climare Diagram Guwahati (Weather Atlas, n.d.).

The erosion processes on Rani Chapari are also significantly influenced by the Brahmaputra. On the one hand, the regular flooding can lead to the erosion of the loose, unvegetated alluvial soil surface. On the other hand, the higher flow rates and currents of the water masses, which constantly affect the island banks, can cause complete sections of the island to slide off. For example, one farmer reported that he lost entire fields near the riverbank because the subsoil slid into the river (Interview CK 04/10/2022, Rani Chapari). Such an incident sometimes has existential consequences for the farmers, as they own the land informally and thus do not receive any compensation for their land and crop loss.

Talking to various farmers revealed a limited scope for action during the flood events. Nevertheless, some preventive measures in the behaviour of the farmers could be observed. At first, farmers take advantage of the physical conditions of the char on the lower level, which is strongly affected by floods. To do so, they move to the char plateaus during floods and set up temporary huts to protect their livestock from the floods. In these cases, the farmers also sleep on the island to look after their own livestock. The natural conditions are also the determining factor why fields are mainly located on the central plateau of the island. To counteract the floods and protect their own crops, some farmers resort to another preventive measure. They use soil from near the shore, transport it to the interior of the island and use it to raise their fields, huts and storerooms, thus also protecting them from higher floods (see Figure 4 and 5).However, this is a time-consuming and costly measure that many farmers cannot afford. The scope for action in crisis management is consequently severely limited for farmers with little capital. Farmers who own land on the lower level of the island, because the high level is already fully cultivated, furthermore run the risk of losing their land completely due to erosions. One farmer therefore reported on his application to the government. Accordingly, he applied for scientific support in dealing with erosion and flood events (Interview GK 01/10/2022, Dharapur). This illustrates, that the farmers sometimes also use democratic means to enter into a dialogue with the government in order to work out solutions to their challenges.

Figure 4, Elevated Field (Own photography 2022).

Figure 5, Elevated Hut (Own photography 2022).

Several farmers consistently stated that environmental phenomena such as rainfall, flooding and erosion events, as well as temperatures, have become more extreme and irregular in recent years, most likely due to climate change. This trend reinforces the importance of the ability to deal with such events. Especially, as the consequences of erosion lead to irreversible damage for farmers, although they only affect a small number of farmers near the coast. Conversely, severe flooding has consequences for all farmers, and there are more adaptation options for flooding phenomena than for erosion events. Moreover, the consequences of flooding are reversible, as flooding is not a permanent condition and the land can therefore be used again in the foreseeable future. In the event of crisis, a collective behaviour of farmers can be observed in flood-related relocations and the establishment of temporary shelters. It is important to mention, however, that the farmers' adaptability to environmental events depends on their wealth, which means that only financially strong farmers can afford to increase the size of their fields. Similarly, government applications can only be made with the necessary educational capital. In an already fragile space for agricultural production, socially vulnerable actors on the char are particularly at risk of land and income loss.

In addition to natural factors, human conditions also influence the availability and use of limited land. In this context the chars are characterised by a complex system of land distribution based on informal rules

and practices. Almost all farmers are united by their historical connection to land. The majority of the farmers interviewed said that they had inherited their land from their own fathers. This system of inheritance dates back to the 1950s, when the great-grandfathers of the farmers took possession of the then unused land and began to cultivate it. Since then, the land has been passed on from generation to generation. But this series seems to be breaking because their children do not want to continue family farming and instead want to pursue other career paths. The average age of the farmers in the research area of 50-60 years supports this fact. For the farmers, this raises the question of what will become of their land when they themselves no longer have the strength for the hard work in the fields. The most obvious answer would be to sell their land. According to the farmers, the land price of the fields is between Rs 30,000 and Rs 50,000 per bigha. Bigha is the traditional unit of measurement in northern India (cf. Kershaw). One bigha is the equivalent of about 1340 m².

Prices vary according to location. For example, the high-level area, which is more protected from environmental influences, is more valuable than the low level areas. The fact that the interior of the island is already completely divided among the farmers and that, in contrast to the outer area, there are no vacant areas left, further increases the price difference. But a land sale is not easily possible because the farmers own the land informally. Since the farmers do not have any land certificates, it is not possible to conclude a legally binding contract. In the few cases where the land nevertheless changes hands informally, the sale is supervised by the Union to safeguard both parties. The Union, which acts as a controlling body in this case, is the central organisational unit of the farmers and is examined in more detail in the Labour chapter.

However, many farmers do not have the financial means to purchase land. One option to still be able to cultivate land is to use the Khajana system. Khajana can also be an advantage for the landowning farmers, for example when they become too old to cultivate all the land on their own and the sale is difficult for the reasons described above. "Khajana" is the regional term for a kind of shared cropping system, which is practised in three different forms on Rani Chapari (cf. Byres 1983). On the one hand, land can be divided between owner and tenant. The divided land is then used individually and independently and generates its own profits. In this model the ownerless farmer pays rent, which can consist of a negotiated fixed land tax or a share of the profits. The second model can be called profit sharing. Here, the land is not divided up but managed collectively. Accordingly, a joint profit is created, which is then shared. Whether there are also rent payments between the

owner and the new farmer depends on the agreements.

The third model is based on the outsourcing concept. In this case, the owner gives his entire land into external hands and benefits from rent payments itself. The profits from agriculture, on the other hand, are entirely at the tenant's disposal, unless an additional profit share has been negotiated (cf. Sharma & Dréze 1996). In addition, the Khajana system can also function as an access to permanent land ownership for tenants. For example, we spoke to a farmer who once rented land himself. He farmed the land for several years together with the owner, an older farmer. As the owner's son was not interested to be involved into agriculture, the farmer was looking for a future solution for his landholding. Through years of working together, the owner and tenant built trust with each other. This finally enabled the farmer to buy the land from the previous owner in 2013 for Rs 480,000 (16 bighas). The buyer had saved up the money from the reserves of the profits from the rental period (Interview LA 29/09/2022, Rani Chapari). The Khajana system thus acts as an important model for propertyless farmers to also participate in agriculture on the char.

In addition, to gain access to land, landless farmers also benefit from the opportunity to exchange knowledge. Moreover, the Khajana system offers a potential opportunity for upward mobility for previous wage labourers. They would have more responsibility, which at the same time reduces the dependency ratio and allows for greater financial profits. At the same time, it shows older owners who have no successor a future perspective for dealing with their informal landholdings. The exchange of knowledge can also be beneficial for them. In addition, their own land can be used more effectively, which increases productivity and thereby also profits. On the other hand, the rights of co-determination can also lead to conflicts over land use, management and profit distribution.

The land-related activities on Rani Chapari Island are a historically evolved interplay of socio-cultural relationships that are influenced by natural conditions. The key to agricultural production in such a fragile space is the adaptability of the farmers and the historically developed knowledge in dealing with external environmental influences. The farmers' intergenerational interaction with their land shows that Rani Chapari has a natural existence, but is at the same time culturally constructed (cf. Akram-Lodhi 2021, 72-79). The char is consequently shaped by the actors and their social relations, practices and identities.

Labour

In order to shed light on agrarian practice from a labour perspective, it is particularly worthwhile to look at labour relations and the organisation

of the individual char actors among themselves. Specifically, this involves the labour hierarchies among farmers and wage labourers.

The most important and influential group of actors in agricultural practice are the farmers. This is because they own the land and accordingly have a direct influence on the cultivation of the char. In the relevant char literature, island actors are usually referred to as socially marginalised Muslims who are increasingly settling on the chars (cf. Kumar & Das 2019, 92). In the case of Rani Chapari Island, however, the farmers are mostly Hindu Assamese (Interview GK 02/10/2022, Dharapur). Many of them are also from the region and live in Dharapur, a suburb of Guwahati that lies directly on the riverbank in close proximity to the char. The regional origin is based on the intergenerational inheritance of the land discussed in the land chapter. In this regard, the demographic homogeneity of the farmers is not only evident in their age (mostly 50-60 years) but also in their gender. The farmers are predominantly male. In the research area, women are rarely involved into farming and tend to take on supporting roles. In this context, one woman interviewed reported that she is currently supporting her husband as he is limited by health problems (Interview BR 28/09/2022, Rani Chapari). From a cultural-historical understanding, there is a clear division of labour between male and female farmers. While women are responsible for food preparation and everyday field work, men do the physically heavy work, mainly attend union meetings, sell the agricultural products and are ultimately the responsible decision-makers.

For the organisation of agricultural practice among themselves, the farmers have created the complex system of a union. All farmers are members of the Union, which is divided into twelve committees. The individual committees regulate the organisation of the farmers within individual sections of the island. The Union is led by a President, who is followed by a Secretary and ten executive Union members. This executive committee is elected by the farmers (Interview AK 25/09/2022, Rani Chapari). The meeting place of the Union is the temple, where meetings are held (see Map 3). The tasks of the Union include not only pure exchange among the farmers but also solving problems among themselves. In addition, the Union acts as a control body when contracts are concluded, such as monitoring the sale of land among farmers. Furthermore, the Union enters into negotiations with the government and represents the position of the farmers.

For example, the Union negotiates a contingent for seeds and fertiliser with the government, which is made available to the farmers by the state. The various committees of the Union are then responsible for the distribution of resources. The Union also pushes important projects. For

example, after two years of negotiations with the government, an agreement was reached that enabled the installation of 35 solar panels on the island (see Figure 6). These solar panels are now an important infrastructure on the char, ensuring large-scale and stable irrigation of the fields. The project was implemented through a tendering system and finally awarded to one of the farmers, who was then commissioned to install the solar panels. The Union's current project deals with the farmers' land rights. For this, the Union is trying to formalise informal land ownership through official certificates. Although farmers would have to pay land tax if the land were registered, the farmers interviewed favour formalising the land. The reason for this is the advantages in terms of more decision-making options, for example through the legal way of selling land. In addition, formal ownership can safeguard farmers in the event of a potential loss of land due to erosion or also prevent a potential land grab. The advantages of land registration thus outweigh the disadvantages for farmers. However, it is still unclear whether and when this will become possible.

Figure 6, Solar Panel (Own photography 2022).

In its organisational structure, with a democratically elected leadership level, the Union is thus part of a hierarchy that contributes to maintaining order among the peasants. At the same time, it also represents a power imbalance that can be exploited. For example, some farmers reported that the distribution of resources is unfair and that the executive members would allocate a large part of the state funds to themselves (Interview SC and BO 01/10/2022, Rani Chapari). This

distributional inequity can lead to tensions within the community. It would therefore be important to resolve such conflicts of objectives for the continued functioning and social acceptance of the union.

The second group of actors on the char are the wage workers. In contrast to the farmers, they are on average much younger and are predominantly Muslim (Interview SA 26/09/2022, Rani Chapari; Interview GK 02/10/2022, Rani Chapari). Moreover, unlike the farmers, they are also not from the region and are often landless people who regularly change their workplace depending on the availability of work. Wage labourers work for the farmers in the fields. However, only affluently farmers can afford to hire one or more labourers. Basically, there are two types of labour relations between the two parties: the daily wage earner and the monthly wage earner. The payment is in turn identical. While daily wage earners earn Rs 400 per day, monthly wage earners receive either Rs 400 per day as well or Rs 12000 at the end of the month, depending on the negotiation.

The advantage of daily labourers is that they are much less dependent on a single farmer and can change their jobs flexibly and decide independently at any time whether and for who they work. But they lack financial security. Monthly wage earners, on the other hand, commit themselves for at least one month. Some farmers, however, had workers that they had already employed for several years. Monthly wage earners are thus more dependent on a single farmer, but enjoy slightly greater financial stability and can stay overnight in the farmer's huts on the island if necessary. An employment contract exists only verbally between farmers and wage labourers. In addition, the farmers do not provide any protective and work clothing, such as gloves or safety glasses and breathing masks when working with pesticides. The safety precautions must therefore be worn by the workers themselves if they wish to do so.

However, as this equipment costs money, most wage workers were found without protective measures. There is also no health insurance for the workers, but in case of accidents at work, the farmers help the workers to get to a doctor or hospital. In general, the labourers do very heavy physical work, are exposed to the burning sun every day and are at health risk due to the use of pesticides. Furthermore, the wage workers are neither part of the union nor are they organised in any other way. They therefore have no right of co-determination in decisions that directly or indirectly affect their work and are thus to be considered a particularly vulnerable and socially marginalised group.

The high workload and poor occupational health and safety for wage workers are also potential sources of conflict in the relationship between

workers and farmers. Added to this are the cultural differences between the two parties. The wage workers are in a relationship of dependency to the farmers due to corresponding power relations, which is reinforced for example by the lack of written employment contracts. Therefore, in case of doubt, oral agreements are more difficult to enforce. So, there is a clear imbalance in the relationship between farmers and wage labourers. However, since both parties understand nature as the basis of their livelihood and want to generate the highest possible income, common interests can also be observed. The fact that some farmers have employed the same wage labourers for years shows that a good relationship between both actors is definitely beneficial for both. Thus, mutual trust and stronger community ties also potentially have a positive impact on the economy. A trust-based and successful economy can additionally lead to more responsibilities and rights for wage workers in the long run. An important instrument in this context, also with regard to the inheritance problem of older farmers, can be the Khajana system.

The Labour perspective shows a clear labour hierarchy between the farmers and the workers on Rani Chapari. The farmers own the land, dispose of it and are organised. The Union is the key democratic organising body for agrarian practice on the island. However, the organised power structure also leads to structural conflicts of interests between the farmers. As the wage workers themselves do not own land and are also not organised, this leads to a clear power imbalance to the disadvantage of the workers, which is expressed in increased legally, monetary and social vulnerability. Nevertheless, long-term cooperation can be beneficial for both parties. Basically, workers are less location-bound and accordingly have a more impersonal relationship with the island than farmers. In the land chapter we noted that the char is shaped by its actors and their social relations, practices and identities. However, it is now equally clear that the self-understanding of the actors on the char is also influenced by their land relationship, which in turn has a direct influence on social hierarchies and labour relations (cf. Pattenden 2021, 91-98).

Market

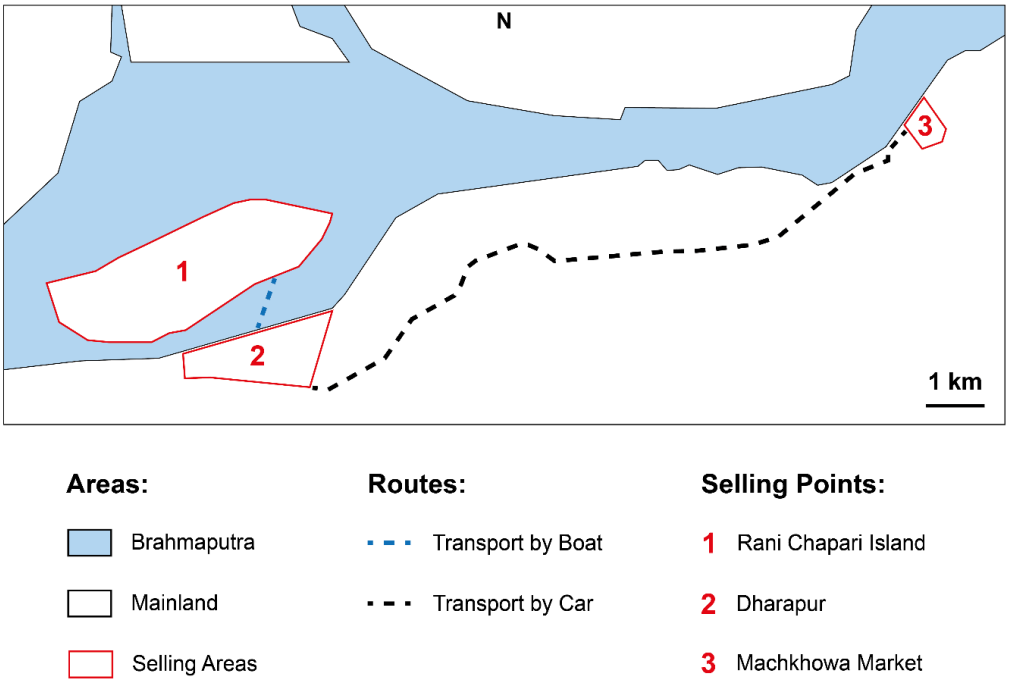
Assam has a long tradition of agriculture, which is closely linked to the culture and life of the people. Thanks to its geographical location, characterised by fertile land (especially on the chars) and numerous rivers, a variety of agricultural products can be traded in Assam's agricultural markets. Moreover, Assam's agricultural marketing environment differs from other states due to its heterogeneous functioning (cf. Gogoi & Saha 2020, 1812). Guwahati, as the vibrant trading capital, has a special role, because it ensures the distribution of agricultural products

for the entire region. The agricultural market is largely regulated by The Assam Agricultural Produce Market Act of 1972, which aims to protect the interests of farmers and consumers by ensuring fair pricing and good quality of produce (cf. Government of Assam 1972).

Despite regulation, there is still informal trade in produce for example through middlemen, which reduces market transparency. Although India's agriculture has steadily developed and modernised in recent times, its cultural significance and connection have not been lost. Accordingly, traditional selling practices are still present in the agricultural market in Guwahati—including the constant renegotiation of prices, the loose storage of goods in large containers or sacks, and the importance of relationships and trust between suppliers and buyers. The following chapter analyses the integration of production into the agricultural market of Guwahati. For this purpose, the actors of the market and their interests are presented along the farmers' selling options, the decision-making of the farmers is analysed based on their constraints and strategies, and final conclusions are drawn.

Actors and interests

The agricultural market in Guwahati is not only a place for buying and selling goods, but also place where different actors interact. As part of our field research, we talked to farmers, middlemen and market traders. Basically, farmers sell their products either to middlemen, market traders or directly to customers. The decision to sell the goods depends on a variety of factors such as price, locational advantages or disadvantages, transport routes or personal relationships. From our interviews, we were able to identify three sales locations and two transport routes of the farmers, which can be traced in Map 4.



Map 4: Selling Points and Transport Routes (Own illustration with Google Maps 2023).

Sales to middlemen are either done on Rani Chapari (location 1) or in Dharapur (location 2). Although location 1 offers the advantage of saving transport costs and time, it is rarely used due to the small number of potential buyers and comparatively low prices. Far more popular is the sale in Dharapur, for which the farmers transport their goods by boat 1 km to the river bank (transport route 1). Middlemen have a hinge function between producers and end buyers. With the aim of making profits through buying and selling, the interest of the middlemen is to stabilise the market for agricultural products and to maintain relationships with both the end buyers and the farmers. Since they trade in large quantities at local or bigger markets in the area, middlemen have a high degree of market power. In this context, one middleman explained that he prefers to sell his goods at a wholesale market in Shillong (Interview KA 25/09/2022, Rani Chapari/Dharapur). Knowledge of market dynamics gives them additional leverage in setting prices. Manipulating prices can lead to conflicts with producers and was often criticised in interviews with farmers.

Another option for farmers is to sell their produce on the local market (location 3). The interviewed farmers prefer the market in Machkhowa because it is close to the town centre and they can sell to market traders as well as to private customers. Yet, the 13 km transport of goods by smaller trucks is time-consuming and resource-intensive for the farmers compared to the other locations. Besides the resources to manage the

route, the farmers have to be on site between 4 and 6 a.m. to negotiate prices and quantities on a daily basis. However, the comparatively high price that farmers can obtain from market traders speaks in favour of selling at the market. The latter (like middlemen) are interested in maintaining a stable supply chain of agricultural products and making a profit through buying and selling. Market traders have medium market power as they serve local markets and usually trade in small quantities. Nevertheless, as final buyers, they have a greater influence than farmers and can therefore influence prices. The cultural background of market traders, with different religions, languages and regions of origin, is diverse. This can explain why relations between farmers and market traders were perceived as more business-like and less personal. Constant renegotiation and changing business partners may also play a role.

Constraints and strategies

Farmers are subject to a variety of constraints within the agricultural market, which they counter with different strategies. Although they formally have a high degree of market power as producers, in practice they are often forced to make decisions contrary to their actual interests. An important factor in deciding where to sell is the farmer's economic capital. As an example of this, one farmer told us that although he would like to sell at the market, he cannot afford labour to look after the fields and livestock in his absence (Interview UK 25/09/2022, Rani Chapari). In such cases, selling to middlemen is often the only option. This is aggravated by the fact that farmers get a lower price from the middlemen. According to one middlemen, his profit share is on average 20 per cent. This is relatively high given the amount of work for the farmers have to produce. It takes him about 8 hours to purchase, load and sell one truckload (approx. 1,800 kg).

By comparison, with agricultural production from cultivation to harvest, farmers are engaged in physically hard work for several months, depending on the cycle. The profit sharing is therefore not in proportion to the labour input, which was the reason for the middleman from Dharapur, who was once a farmer himself, to enter the business of the traders (Interview BK 04/10/2022, Dharapur). In theory, the market would ensure that if individuals had full freedom of choice about where to sell, these conditions would not be possible. In practice, however, the individuals' freedom of choice is not given. Small farmers in particular are forced to accept the low prices of middlemen due to time and resource constraints, while middlemen have a better bargaining position and therefore have the possibility to depress prices. This can result in an asymmetrical relationship between farmers and middlemen.

To strengthen their position, farmers have developed several strategies. First, many farmers are diversifying their product range to minimise risk. The decision on the cropping pattern is thereby determined by production and price risk (cf. Mandal & Bezbaruah 2013, 169). For example, one farmer together with his monthly labourer stated that despite the high profitability of mint cultivation, they do not rely exclusively on it to counteract the effects of price fluctuations (Interview DK and SA 26/09/2022, Rani Chapari). This allows them to respond to changes in demand and optimise the price of their produce. Secondly, almost all farmers built up capital reserves through livestock farming that can be sold in times of financial scarcity. Thirdly, building social capital through relationships with middlemen and other farmers can help strengthen the position of farmers. For instance, a middlemen from Dharapur confirmed to us that he provides credit to farmers, which is particularly important during periods of financial shortfall when formal credit options are limited due to lack of financial security (Interview BK 04/10/2022, Dharapur). However, informal loans need to be differentiated for two reasons:

First, these loans are not exclusively used for agricultural purposes, but also for private purposes such as building a house or the wedding of children. These costs do not generate direct economic returns and can increase the financial burden. Secondly, the interest rate depends on the willingness of the middlemen to take risk. In particular, small farmers with low production volumes are more likely to lose credit, which can lead to risk-averse behaviour and result in higher interest rates (cf. Sinha 2020, 262-63). In contrast, formal credit systems, such as the Kisan Credit Card, can increase agricultural inputs and income, as well as reduce dependence on informal lenders (cf. Kumar et al. 2022). Finally, we identified a fourth strategy of farmers in collective behaviour, as farmers cooperate in transporting their goods by sharing transport and costs. At this point, game theory can shed light on the potential that cooperation holds for farmers. If all farmers act individually, they have to decide whether to make more money on the market by spending a lot of time and resources, or whether to accept a lower profit for quick and easy sales to middlemen. To overcome this dilemma, farmers could cooperate by making collective decisions on, for example, minimum selling prices or the choice of selling location. This form of cooperation can strengthen their negotiation position, achieve better prices and increase the real market power of farmers.

A look at the market integration of agricultural production shows that the Guwahati agricultural market is a complex and adaptive system characterised by high institutional and organisational diversity. It is a

place where a variety of (non-)capitalist actors with different interests coexist; and 'where the agency of many individual actors exists alongside the structural constraints of economic concentration' (Jan & Harriss-White 2021, 171). For Rani Chapari Island, it turns out that the formally high market power of farmers as producers is in practice undermined by constraints that limit their scope for decision-making. Although farmers draw on versatile and effective strategies to counter their constraints and dependencies, these still persist due to limited opportunities for farmers. It is therefore important to support farmers in their efforts and to take measures to strengthen their position in the agricultural market. Such support could be in form of financial assistance, training and advisory services, or the strengthening of institutions and networks that promote exchange and cooperation among farmers. A stronger position of farmers in the agricultural market can improve income security and product quality, stabilise and increase the sustainability of traditional agricultural production, and have positive impacts on the value chain and local communities.

Conclusion

Agrarian practices on Rani Chapari Island in Guwahati/India are shaped by a variety of factors that manifest themselves in complex structures. In this paper, the key findings of our two-week field research in the areas of land, labour and market were revealed and discussed.

At first, land-related activities on Rani Chapari Island were analysed from the perspectives of a technical understanding of cultivation, the implications of land-water hybridity on the site for agrarian practice and the relevance of crisis management, as well as from the perspective of the land rights situation. It became apparent that the char is not only constructed by its natural conditions but also by historically developed socio-cultural relationships. In such a hybrid space, the adaptability of the farmers to the conditions and the further development of strategies are of crucial importance for a successful agricultural practice. At the same time, informal ownership brings additional constraints for farmers, which are countered through the use of a shared cropping system as well as an organisational structure among themselves.

The labour perspective examined the two groups of actors, farmers and wage labourers, their labour hierarchies and organisation. In the course of ownership and organisation, a clear imbalance of power between peasants and wage labourers becomes apparent, which results in increased vulnerability of wage labourers. Nevertheless, long-term cooperation between the two parties can be beneficial for both. Of particular importance for agricultural practice on Rani Chapari is the

union. It ensures organisation, offers the possibility of democratic participation for all farmers and is in direct exchange with the government. It is thus also the crucial body for resolving projects such as the fomalisation of land rights. However, it is also the starting point for conflicting aims. The ongoing organisational structure of the Union will therefore be a key factor for the future conditions of agrarian practice on Rani Chapari.

Finally, the integration of agricultural production into the agricultural market of Guwahati was analysed by presenting key actors and their interests, and highlighting the farmers' decision to sell based on market constraints and strategies. It turns out that the agricultural market of Guwahati is not an abstract space of economic trade. Rather, it is a heterogeneous space of socio-economic interaction that is shaped by and reproduces various power relations. For small farmers in particular, freedom of choice is limited by constraints and dependencies that can only be overcome to a certain extent, despite a variety of strategies. In order to ensure the sustainability of traditional agriculture, the efforts of farmers need to be supported more strongly by the government.

A holistic view of agrarian practice focusing on land, labour and market has proven valuable as these three pillars are closely interlinked and influence each other. A recent example of this is the Union's efforts to obtain land certificates to strengthen the legal position of farmers on land sales and shared cropping as an additional market option. This demand indicates that a holistic view of agrarian practice can help to show spaces for solution approaches to overcome the challenges within agrarian practice.

At this point, it is important to emphasise that the possible courses of action identified in this study have not been prescribed by us, but have emerged from discussions with actors in agriculture around Rani Chapari. We are aware that as external actors we have been socialised in a different cultural space and that the research period of two weeks is comparatively short. Therefore, the options for action should not be regarded as final solutions and require further practical testing and critical reflection.

We are confident that through respectful collaboration and consideration of local conditions and needs, sustainable solutions can be found that not only support agriculture, but also strengthen the environment and the community on the chars in the long term. Given the increasing threat of climate change, it becomes even more urgent to ensure that the unique ecosystems of the chars are protected. The preservation and continuation of traditional and sustainable agricultural practices on the river islands by local farmers is crucial for this.

Endnotes

[1] Own calculations with Geographic Information System (GIS).

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Appendix

Interview list

Initials	Actor	Location of Interview	Date*
AB	Farmer	Rani Chapari	04/10/2022
AK	Farmer, Union Secretary	Rani Chapari	25/09/2022
BH	Farmer	Rani Chapari	28/09/2022
BK	Middlemen	Dharapur	04/10/2022
BO	Farmer	Rani Chapari	01/10/2022
BR	Farmer	Rani Chapari	28/09/2022
CK	Farmer	Rani Chapari	04/10/2022
DI	Farmer	Rani Chapari	28/09/2022
DK	Farmer	Rani Chapari	26/09/2022
FA	Farmer	Rani Chapari	25/09/2022
GK	Farmer	Dharapur	01/10/2022
JK	Farmer	Rani Chapari	26/09/2022
KA	Farmer, Middlemen	Rani Chapari	25/09/2022
LA	Farmer	Rani Chapari	29/09/2022
MA	Farmer	Rani Chapari	29/09/2022
MT1	Market Trader	Machkhowa Market	27/09/2022
MT2	Market Trader	Machkhowa Market	27/09/2022
MT3	Market Trader	Machkhowa Market	27/09/2022
MT4	Market Trader	Machkhowa Market	27/09/2022
MT5	Market Trader	Machkhowa Market	27/09/2022
MU	Farmer	Rani Chapari	28/09/2022
NY	Farmer	Rani Chapari	29/09/2022
PB	Farmer	Rani Chapari	25/09/2022
RK	Farmer	Rani Chapari	26/09/2022
SA	Labourer	Rani Chapari	26/09/2022
SC	Farmer	Rani Chapari	01/10/2022
SJ	Farmer	Rani Chapari	29/09/2022
SK	Farmer	Rani Chapari	04/10/2022
TE	Farmer	Rani Chapari	25/09/2022
UK	Farmer	Rani Chapari	25/09/2022

*Some interviewees were interviewed several times and on different days.