

A Conversation on Deltas

Geo-Reflections-8

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- GS: What made you decide to study deltas around the world?

- ❖ SF: I pursued my Master's dissertation in 1982 on the Yapaterra River Valley of Peru, which is located within the coastal desert of Peru. This research aimed to understand the role of the river and water in the development of the region's rich agricultural economy and a prosperous farming society.

In that programme, we were four students working under the supervision of a professor, a specialist in the geography of Peru, who had developed a partnership with the University of Lima. The Yapaterra valley had very fertile soil and plenty of water. It was a place with lots of greenery, like a river oasis in the middle of a desert. When we arrived there, it was about six months after the terrible river flood caused by that year's active El Niño. The whole valley was destroyed, including mud houses, roads, and orchards. People were helpless and distressed, waiting for someone to come to their aid. The

flood exposed the fact that those communities were not merely highly dependent on the river; they were completely unorganised and unable to rescue themselves from the crisis of a big flood.

I was 22, a young researcher, a bit naïve. I could not understand why the local people did not do anything to get over the crisis, leaving everything in a devastating condition, as it was, following the flood. They just waited for six months for the situation to resolve itself. This community was a mixture of Native Americans, descendants of enslaved Africans, and many other mixed-race people who had been working under the latifundia system controlled by white large landowners during the colonial Spanish regime in Peru. Afterwards, although the latifundia system was replaced by cooperatives, these communities remained unorganised because they lacked a strong community spirit. Therefore, they could not recover from major natural

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disasters such as the devastating flood.

I was supposed to do my PhD there in Peru, but I thought I could not stay in a place where people were not organised and lacked a sense of community spirit. They lived in a rich valley where intensive farming of fruits and cereals was practised, but they could not organise themselves. They had been living there for generations, but could not build their community strength because of their diverse roots and the continued violence of colonisation and slavery. This Master's dissertation taught me that a geopolitical perspective is vital for understanding the societal organisation of a hydraulic system and its development over time.

- GS: Why did you decide to work on the Nile Delta for your PhD?
- ❖ SF: I was pretty shocked at the observations from my earlier study on Yapatara valley, where, instead of benefitting from living in a rich environment, the people could not organise themselves to repair the damage caused by the flood in a collective way. At that stage, I wanted to study a similar environmental condition around rivers and water, where people were better organised at the local and regional levels, covering the entire river valley, and had developed a strong hydraulic society by working together over a long time. The Nile Delta in Egypt was an example of such a site. Along with another batchmate from the same laboratory, I decided to go to Egypt for my PhD. It was one of the world's most ancient hydraulic civilisations, which had survived for centuries

thanks to the Nile floodplain farming community, their scientific and technical knowledge, and the state's centralised control over water and land. My batchmate decided to work on hydro-politics and conflicts over the Nile River between the upstream riverine countries, and I decided to continue understanding the river and the hydraulic society in the Nile delta.

At that point, I realised that local-level geopolitics (meaning politics around the distribution and conflicts over land and water) matters a lot in understanding social organisations in riverine environments. I requested one professor from my university, i.e. Paris 8, to supervise my PhD on the Nile Delta.

- GS: Who did you request to be your mentor for your PhD?
- ❖ SF: The professor was Yves Lacoste, a renowned geographer and the founder of the School of Geopolitics in France, who had already written his book *Le Géographie ca sert d'abord a faire la guerre* (Geography serves, first and foremost, to wage war) in 1976. The core argument was that Geography is the discipline that teaches how to control people and territory to wage war. For him, geopolitics is the study of conflicts and competition over land and water at different scales. Because of his expertise in geopolitics, especially in the Red River delta of Vietnam, I considered approaching him to supervise my PhD on hydraulic societies and deltas in Egypt.
- GS: Why do you think that geopolitics matters so much in studies of Deltas?

❖ SF: The idea that the environment determines everything does not work for Deltas. If it did, all the deltas in the world, which are rich in land and water resources, could be transformed into thriving farming, fishing, and trading regions. However, some deltas in Europe are empty, while others in Asia are overpopulated. This means that only the politically powerful empires and states could exploit the deltas' water and soil. Many states or kingdoms lacking that geopolitical power could not develop other deltas into rich hydraulic or fluvial societies.

This geopolitical approach provided me with the opportunity and methodology to understand how and why some of the most developed civilisations emerged and flourished in delta environments. Delta dynamics is not an issue that can be studied solely by physical and environmental scientists; instead, it requires interdisciplinary research combining three perspectives—biophysical (land and water), socio-demographic, and politico-historical. Deltas have historically been at the centre of contestations between power regimes (e.g., empires, states and localised power groups like pirates) due to their physical resources and their location at the frontiers of ocean- and river-based trade routes. In the study of deltas, the scale of analysis matters a lot. To better understand deltas, we need to analyse various kinds of conflicts over water control and river management, not only at the local scale of the actual delta, but also between upstream and downstream countries, provinces, and communities. These water conflicts

are embedded in broader conflicts, sometimes leading to war that ultimately harms the deltas.

- GS: Can you tell us from your research what precisely the role of geopolitics is in the Nile Delta? Is it because the river flows through several African states?

❖ SF: I tried to understand how the process of densification has happened in a place like the Nile Delta, which faced high floods almost every year. It flourished as a civilisation in the midst of a desert because of floods that brought water and silt, making the area highly productive. For millennia, people in the Nile delta under state control developed a well-organised irrigation system to transform the entire territory into productive agricultural land. The role of geopolitics lies here in the power equations of the state to control the land through the organisation of the hydraulic system. It is a desert area and used to get hardly any rain. Only a well-organised hydraulic system could implement intensification of the agricultural system, followed by population densification. The Nile delta is the most densely populated; its population density is twice that of the Bengal delta. Indeed, geopolitics was everywhere in the Nile Delta, especially over control of the canals, the Nile, and its many distributaries, as these were integrated into international trade routes before the construction of the Suez Canal.

- GS: Did you look into the changes in the Hydraulic systems of both the period before and after the Aswan Dam was built on the Nile?

❖ SF: No, it was not just before and after the Aswan Dam; my work focused on the historical changes in the Nile Delta over a more extended period, and on understanding how the population, settlements, and agriculture changed during different historical regimes under other kingdoms. Egypt has always been a hydraulic society in the middle of the desert, which scholars have studied for more than two millennia, and these studies are recorded and preserved. Herodotus invented the term 'delta' 2500 years ago to describe the lower reaches of the Nile valley because of the triangular shape of that area, which resembles the Greek letter 'Delta'. I collected maps of the different political regimes from the archive and compared the territories under cultivation and the locations of cities along the Nile and its branches under those regimes.

- GS: What kind of changes in the delta did you notice from studying those maps?

❖ SF: I observed that the territories occupied by the settlements and agriculture in this delta have expanded and shrunk many times under different rulers. During Roman rule over the Nile Delta, the territory expanded considerably, and many cities emerged where water and trade administration were concentrated.

- GS: Could you explain how early cities grew around the hydraulic system?

❖ SF: Cities emerged along the seven branches of the Nile and its canals, to take control of the riverine trade and to maintain the irrigation

system, which required the accumulation of money, power, technology, and labour. Taxes were collected from boats and ships using the rivers and canals, as well as from the trade in agricultural products, and were used to finance hydraulic and territorial management. The cities were where the administrative offices for all these activities were located. During the Roman period, as trade and hydraulic engineering flourished on a larger scale, the number of cities grew. These cities were all connected by riverine trade routes to Alexandria, the world's largest port city for centuries.

- GS: So, the Roman period was an example of a period of territorial expansion in the Nile delta. Could you please tell us about a period when the territories in the delta shrank?

❖ SF: In the 14th century, Egypt was ruled by the Mamluk Sultanate. They were not interested in agriculture and, consequently, in maintaining the irrigation system. The number of cities decreased from 48 during the Roman period to 12 during this regime. The size of the populated territory decreased to half its size during the Roman period. This expansion and contraction also underscore the importance of geopolitics and the control it exerts over water, population, and land in the delta region.

- GS: You mentioned a question of scale in geopolitics; can you explain that?

❖ SF: Before arriving in Egypt, the Nile River nourishes the lands of nine other countries with its water and silt

in its upper reaches. If those countries had been powerful enough to control the Nile hydraulically, Egypt could not have flourished in its downstream areas. Because of its very high geopolitical power, Egypt controls the water distribution of the entire river. Until 2011, Egypt could prevent any other upstream country from building a dam on the Nile. Therefore, to develop hydraulic societies in the delta, you need to deal with local, national, and sometimes international geopolitics.

- GS: What is the role of the Egyptian government and the Aswan Dam in the geopolitics of the Nile Delta?

- ❖ SF: Since the British era of colonisation, Egypt has played a very important role in the Africa and West Asia region due to the location of the Suez Canal adjacent to the east of the delta. The British also wanted access to and control over petroleum in West Asia. Therefore, they needed Egypt to be stable and developed. They granted Egypt control over the Nile's water. When the Great Aswan Dam was built in 1970, Egypt gained a larger share of water at the expense of Sudan and other riverine countries, which were forbidden from building dams upstream on the Nile. Since the Arab Spring revolution in 2011, the Egyptian government has become weak, and the Ethiopian government has seized the opportunity to build the Renaissance Dam on the Blue Nile. It was their dream project for a long time, but it could not be undertaken because of the strong Egyptian government under President Mubarak. The construction of this

dam could lead to a water war on the Nile once it comes into operation, significantly reducing flow to the Nile Delta.

- GS: After your PhD on the Nile Delta, which delta did you work on?

- ❖ SF: After my PhD, Yves Lacoste, my mentor, advised me to study the Red River delta in North Vietnam.

- GS: Why did he tell you to go there? What was the specificity of that delta to look into?

- ❖ SF: This suggestion came from his earlier study on the Red River delta during the Vietnam War against America. As a renowned expert on geopolitics, he had been invited by the communist government of Vietnam to provide evidence that the US army had been bombing the dykes in 1972. He studied the Red River delta and its hydraulic structures at great length and made a comprehensive assessment of the river dykes, based on the maps prepared by the geographer Pierre Gourou. He demonstrated how the US army had targeted the most vulnerable parts of the dykes and the eastern flood-prone areas, and bombed the immediate bases of the dykes near the high meander curve of the river, where the current of the river was strong. This made the dykes highly vulnerable to breach during floods. His research showed that the US Army's destruction of hydraulic structures would make the Red River delta vulnerable to flooding again. According to international rules of war, no bombing is allowed of hydraulic infrastructure such as dams and dykes. After mapping and

analysing those bombing spots, he went back to France and wrote a report for the Vietnam government, explaining the incidence of bombing in the vicinity of the dykes in the densely populated parts of the Red River delta, and also published an article at length for France's famous newspaper, called *Le Monde*. However, due to the highly sensitive diplomatic context, the US military continued to deny Yves Lacoste's allegations, claiming that they had only bombed weapons depots or anti-aircraft batteries.

- GS: Do you think that this incident made a lasting impression on Yves Lacoste about the importance of geopolitics and associated hydraulic control of the state in a fragile and rich area like the Red River delta?

- ❖ SF: Maybe that was the case. However, I could not start that research immediately after completing my PhD, as I had joined the Institute for Research and Development as a researcher and was supposed to work on integrating cattle farming with crop farming in Senegal. I worked on that issue for six years. Once that assignment was over, I turned back to deltas again, because the highly populated delta was living in my heart. I then followed my mentor, Yves Lacoste's, earlier advice and went to Vietnam to study the Red River delta.

- GS: Did you look at the geopolitics of the Red River delta as you did for the Nile?

- ❖ SF: No, it was challenging to work on local hydro-politics in Vietnam, because the country was sensitive to

research on any geopolitical issues due to its authoritarian Marxist regime. Another problem with such research in Vietnam was the lack of local partners willing to take the risk of addressing these kinds of questions. Most institutes and scholars working on rivers and deltas focused on physical issues of rivers, leaving out the social and political aspects. I had to find another way to understand that issue.

- GS: What were the other issues you looked at in your research on the Red River delta?

- ❖ SF: At first, I wanted to experiment and see whether the methodological framework I had developed in the Nile delta would work in the case of the Red River delta. I wanted to understand how that fragile delta, highly vulnerable to floods, could be so densely populated. I started with the history of population settlement in the lower and upper parts of the delta, and I realised that, despite a very intensive system of rice farming with three crops a year, agriculture could not explain such high density. Then I looked into the other livelihood activities in the delta and observed that, besides farming, a large proportion of people were engaged in artisanal activities and the related trade in raw materials and finished products. Those activities were more concentrated in the low-lying areas affected by floods and near waterways, facilitating trade. After considerable fieldwork and mapping of the empirical data, I also observed that many villages engaged in craft

activities and were organised in clusters.

- GS: Why did these artisanal activities flourish in low-lying areas?

- ❖ SF: In Monsoon Asia, the micro-topography of the delta matters a lot, as the lower parts can be highly flooded, making it impossible to produce three rice crops in a year. There is high diversification of activities in these low-lying spaces. Even in the intensive agricultural production system practised on relatively higher ground, there are lean seasons between transplanting and harvesting, when people have to find other work to survive. This diversification of the economy, high population density, and labour-intensive agriculture led to in-situ urbanisation in this delta. I started drawing a map of population density at the commune scale. After mapping, I realised that some areas were highly populated but remained rural, meaning the state did not designate them as urban. In both the Nile and the Red River deltas, urban status has nothing to do with density or people's activities, as in India. 'Urban' in these countries refers to places where state administrative activities, especially those related to land, water, and taxes, are located. They are all just headquarters of different provinces/districts.

- GS: What kinds of crafts did you notice, and how were they linked to the hydraulic system?

- ❖ SF: As Vietnam had been under the rule of China for a thousand years, at the beginning of the independent regime, it had followed the Chinese

system of urbanisation. Because of that colonial legacy, Vietnam followed the Chinese model for organising hydraulic cities and villages. Therefore, in Vietnam, cities were developed as headquarters of the hydraulic state and as the centres of trade and commerce. The industries were scattered across specialised craft villages in the hinterland of big cities. They would supply cities with food and other durable goods, such as ceramics, textiles, paper, metal goods, art, and cultural items, as well as artisans and their skills. Some skills were also inherited from China.

- GS: How would you explain the link between the development of craft activities and the organisation of the delta?

- ❖ SF: Some clusters were located along the Red River and its distributaries because of the ease of transportation, for carrying both the raw materials and the finished products. Because of the dense network of waterways, the Red River delta could flourish in both production and trade. Before roads and railways, deltas were the most important junction points for connecting inland territories with the outside world through coastal harbours. Even after China stopped ruling the country, Vietnam had to pay tribute in the form of bricks, silk, and ceramics. It was part of the deal to gain independence from Chinese rule. This condition stimulated the craft industry and led to the innovation of higher-quality goods to be supplied to the former rulers.

- GS: What is your key message from the study of the Nile and Red River deltas, especially on geopolitics and scales?

- ❖ SF: Studying the Red River delta confirmed the methodology I had experimented with in the Nile delta. What I deduced from the studies of these two deltas is that a multi-scalar approach to time and space is needed to understand the role of the state and geopolitics in the deltas, where the entire environment is shaped by water, both as a resource and a threat.

- GS: So, what was the next delta you worked on after the Red River?

- ❖ SF: I carried on my work on the Red River delta in the process of undertaking many other projects during my seven-year stay in Hanoi. But in 2006, Yves Lacoste gave me the opportunity to edit a special issue of his renowned journal, *Herodote*, on the geopolitics of deltas worldwide. This assignment helped me learn about other deltas and connect with many other researchers working on these issues. After reading extensively about other deltas, I became interested in understanding the Ganga–Brahmaputra–Meghna delta. While comparing the histories of settlement and water control across several Asian deltas, what struck me was that the world's most dangerous deltas in terms of flooding are also the most densely populated in Monsoon Asia.

- GS: From your extensive experience of researching different deltas, how would you like to categorise them?

- ❖ SF: We can create different typologies based on themes such as population density, occupation, and economic activities. Let us start with the population density. To understand this category, we have to go back to the history of settlement, because the densely populated deltas have been developed since ancient times, such as the Nile in Africa and the Red and Yellow Rivers in Asia. They are the cradle of ancient civilisations. We have to ask ourselves why highly developed civilisations emerged in deltas with such dangerous rivers. The answer lies in those dangerous rivers themselves, which brought vast amounts of sediment to the deltas, making the land fertile and providing opportunities for agriculture. People perceived the risk of muddy water destroying villages and fields as worth it for the benefits of good crops in other seasons and for building cities for trade and hydraulic administration.

In developing these affluent hydraulic communities, there was a need for rulers or governments who were financially strong, politically powerful, and technologically sound. There was also a need for an integrated, well-organised society capable of implementing the state's strategies for developing the deltas. These societies prospered based on mutual trust and respect for the knowledge of both the state/ruler and the local village leaders. Although there were hierarchies within the hydraulic network of rivers and canals, there was a mutual understanding of the role of the various actors at every level and scale, from macro to micro. The deltas'

hydraulic networks were also social networks. Even a small gap or break in that big network could cause the entire system to collapse. These actors understood the traditional system of the hydraulic society very well, and that is why they prospered to a great extent even in ancient times and the Middle Ages. Yves Lacoste used to say that these systems continued over a long period of time because of their strongly connected ethnic communities, such as the Viet in Vietnam and the Han in China. They could also easily integrate smaller communities living in the deltas' peripheral areas into their own hydraulic system. Ethnic homogeneity was necessary for the development of strong hydraulic societies. In contrast, the less populated deltas, such as the Mekong, Irrawaddy, and Niger, were home to diverse ethnic communities with different ways of understanding and living alongside the rivers and floods. These societies can be defined as fluvial rather than hydraulic societies (Son Nam, quoted by Bourdeaux, 2013). The difference lies in the fact that all riverine communities know how to live with floods in their own way, whereas hydraulic societies build a coherent water network and system not only to protect them from floods, but also to maximise the use of the rivers' water and silt for their own benefit. To analyse the organisation of water distribution and flood protection, it is necessary to understand the role of each (big and small) actor within the entire network.

- GS: Can you explain the different typologies of deltas based on the

second theme, i.e., the occupation or economic activities of the people?

❖ SF: Yoshiro Kaida (2000), Japanese expert on deltas, has identified three types of deltas in Monsoon Asia based on the occupation of the delta inhabitants. These are the mercantile deltas, the rice production- and export-oriented deltas, and the nourishing deltas with diverse economies, including agriculture and small-scale industrial production catering to local and regional demand. An example of a mercantile delta is the Pearl River Delta in China, the world's largest industrial region in terms of trade. One of the strengths of the Pearl River Delta is the diasporic movement from the Delta towards Hong Kong and other trade centres. This movement helped the delta connect to the global economy in the 1970s. However, this delta had been engaged in mixed activities under imperial rule for a long time, right up to the revolution led by Mao Tse-tung. It had extensively diversified its economy through craft, trade, and agriculture for ages. One process of economic diversification under state initiative was the creation of polders to extend land over the sea by building artificial deltas. This process integrated mulberry cultivation, silkworm rearing, and fish farming in a harmonious, mutually beneficial way. The process was called the Mulberry-Dyke and Fish-Pond System. In that process, they first built numerous ponds over a long time with the help of dykes. Then the ponds were desalinated by bringing in sweet water through canal networks from

the Pearl River and its distributaries. Thereafter, they started planting mulberry trees along the dykes to feed the silkworms and developed the silk industry, as well as fish farming in the big ponds. The silkworm waste on the dykes also fed the fish in the ponds. These labour-intensive activities provided employment opportunities for local people and facilitated the global trade in silk by developing a mixed, localised production system. They simultaneously extended the delta towards the sea. This is an excellent example of how people perceive the benefits of a delta and build a mixed and diversified economic network to prosper. It is also an example of how an integrated network of people and the state operating at different scales can build a prosperous hydraulic society.

- GS: How do you see the local physical environment being negotiated by the people in many different ways to settle and to prosper in the delta areas?

- ❖ SF: Different categories of people and institutions are involved in the process of building delta communities at different scales: the state, the regional institutions, and the local communities. Along with the hydraulic hierarchy of rivers, distributaries, and canals, the geopolitical power reaches the territory at different scales. I want to explain this using the cases of Vietnam. Vietnam has two important, densely populated deltas—the Red River Delta in the north and the Mekong Delta in the south. When the historical development of delta communities took place in these two

areas, they were not part of the same country as they are now.

The Red River delta was the cradle of the Vietnamese civilisation before it expanded southwards into the territories of other independent kingdoms. As it was under Chinese control for a long time, it adopted the Chinese model of organising cities and villages in the Red River delta through centrally controlled state-run hydraulic engineering. This kind of state-controlled development occurred because of the river's physical condition, which used to cause dangerous floods. The steep terrain and rapid flooding were beyond the capacity of local people to adapt. The intervention of the state was essential to control the rivers through building embankments and canals. To finance such initiatives, the state taxed agricultural and trade activities through waterways and controlled the population through 'corvée', i.e., forced, unpaid labour for the maintenance of hydraulic structures, including the dykes. The state used *corvée* labour to build large infrastructure projects, but the maintenance of the water distribution organisations and the repair of local infrastructure were carried out by the powerful family lineages at the village level. In other words, we can say that the power of the empire would stop at the door of the village bamboo hedge. Terry Rambo (1973) in his PhD thesis defined the village communities of the Red River delta as 'closed corporate' communities, meaning self-sufficient farming communities with a strong sense of solidarity during natural events such as floods and economic

crises such as famine. These kinds of societies are built on a common understanding of the entire hydraulic system, but with a strong hierarchy at the local level. That is why the Red River delta communities can be defined as hydraulic communities.

- GS: How would you explain the other category called 'fluvial societies' with reference to the Mekong delta, and how is this system different from that of the Red River delta?

- ❖ SF: The Mekong River is less dangerous than the Red River, as the floods are of lower magnitude due to the low gradient of the river channel, and partial natural regulation of the flood water by the Ton Le Sap Lake of Cambodia, located upstream of the Mekong. These societies never needed comprehensive river control measures, as they could organise agricultural production and trade without major hydraulic infrastructure. They could clear the forest, settle and grow crops (rice) independent of state support. The term 'fluvial societies' is used by the Vietnamese scholar Son Nam as quoted by Pascal Bourdeaux (2013). Son Nam defines fluvial societies as diverse and heterogeneous communities that develop their habitats independently, without state-controlled large hydraulic infrastructures.

The nature of the flood in the Mekong Delta was different from that of the Red River Delta. It was slow and low-level. Through their own observations over generations and indigenous knowledge of nature, water, topography, and natural vegetation, people developed their

own habitats in the Mekong Delta. Here, I would like to highlight an example of how a closed community became open when people moved to different hydraulic conditions. The Viet used to live in a closed community in the Red River delta, but when they moved to the Mekong delta, they no longer needed the same level of community organisation. Instead, they began living in smaller, separate settlements. Thus, the Mekong delta became an agglomeration of open and multicultural societies, focused more on commercial production for international trade. The development of multiple activities through diverse communities made the Mekong Delta the rice bowl of Vietnam.

- GS: You said that different ethnic communities are living in the Mekong delta. How many communities are there?

- ❖ SF: There are four different communities: the Khmer who originally settled in the delta and belonged to the Khmer kingdom of Angkor; the Viet who came from the North of Vietnam; the Chinese who were traders living in small towns; and the Cham, a Muslim community coming from the Champa kingdom located in central Vietnam. Over centuries, they developed different ways to live with the water and to occupy, settle, and flourish in the delta. Initially, the delta communities developed their diverse activities over a longer period at a slower pace, which was more sustainable and in harmony with the river's natural rhythm, such as floating rice farming. However, with colonisation, the speed

of territorial expansion significantly changed the entire delta environment. During the French colonial era (1858–1954), the administration built numerous canals for two reasons: to create waterways for territorial expansion and to bring in sweet water to newly constructed village settlements for agricultural expansion. During this period, many people migrated to the Mekong Delta because the French expanded rice farming there, which required a large workforce.

- GS: You have probably analysed how differently people perceive the delta environment and how they live with floods in Vietnam. Could you tell us more about the different ways in which people perceive the delta environment?

- ❖ SF: In the Red River delta, dykes were built to protect the villages from flooding, but they also prevented rainwater from draining from the plains and created a massive problem of waterlogging. Because of this, people settled in villages on higher grounds, especially on the levees along the river or on artificial mounds. This kind of development required a central organisation to build settlements in such vulnerable environments. In contrast, in the Mekong delta, small migrant communities could settle collectively or individually on existing higher ground, such as dunes (called Phno), which were earlier created by the sea but became part of the delta as the delta prograded. Some of these dunes are 40 kilometres long and are occupied by dense Khmer villages clustered around Buddhist temples.

Later, as the French excavated canals, people began building houses on the canal embankments, which offered higher ground for flood protection. People in the Mekong Delta understood the micro-topography very well. Philip Taylor (2014), in his book *The Khmer Lands of Vietnam: Environment, Cosmology and Sovereignty*, asked the question: 'What makes local populations so sensitive to micro-topography of a few tens of centimetres, in such a flat world?'

- GS: How would you differentiate between the closed societies and the open societies in deltas with reference to Vietnam?

- ❖ SF: Closed hydraulic societies were composed of nucleated villages surrounded by dense bamboo hedges, which protected them not only from floods but also from local pirates and dacoits. They were organised around water distribution and the maintenance of the dykes, which were mainly delegated to them by the state. They were not open to outsiders who migrated there. Families who had lived in the same village for more than five generations were eligible for access to community-owned land. These close communities were built on internal solidarity. This is why some community-owned lands were redistributed to low-income families.

In contrast, open fluvial societies were composed of migrants, which is why they were also open to newcomers. They were kind of like frontier societies that established new territories and communities along canals. They also built houses on stilts or floating houses on small rivers and

canals so they could move from one place to another, rather than being tied to a single community. This is another reason why they are called open societies. These societies developed their knowledge of how to live with floods through experience. They developed diverse economies, including farming, fishing, and floating markets for community trade, as well as international trade through the delta's canals and rivers.

- GS: What changes did the communist government of Vietnam bring to the Mekong Delta when it took over the south and brought the Mekong Delta under the state of Vietnam?

- ❖ SF: In 1975, after pushing the Americans out of Vietnam, North and South Vietnam reunited. The communist government of Vietnam wanted to replicate the Red River's river control system in the Mekong Delta to intensify agriculture. This was a very wrong step taken by Vietnam. They began controlling floods by building full and semi-dykes to increase the number of crops each year, but this process fundamentally changed the way of life of the local people, a system that had been practised for generations. Trying to control the Mekong Delta in the same way they did for the Red River had catastrophic effects, damaging the historical system of sustainable living along the river and with the floods.

They developed a strategy called 'living with floods', but in doing so, they abandoned earlier resilient practices that the people of this delta had developed over generations, such as floating houses, floating markets, and houses on stilts. Now they are

drying out some land by building dykes and draining water to increase the number of crops per year and to settle people there to escape floods. The government prevents people from living along the canals because they are vulnerable to floods caused by both rain and tides, and they want to relocate them to the newly created dry areas. By removing people from flooded areas, they claim to be helping them live with floods. But for people whose livelihoods entirely depend on the water, what will they do in drier areas? The people would also have to buy these new lands. To escape these state-driven hazards, people often migrate to Ho Chi Minh city to work as labourers. This is an excellent example of how the state-controlled top-down approach to the hydraulic system is changing the fluvial system of the Mekong Delta.

- GS: While working in the Red River delta, you also went to study the Niger delta in Africa for a year, on the invitation of the French Institute for Research in Africa. What kinds of information would you like to share with us on the Niger Delta? Is the Niger Delta an example of a fluvial or a hydraulic society?

- ❖ SF: The Niger is the third longest river in Africa after the Nile and the Congo. Because of its numerous branches, it was the natural waterway through which European colonisers entered the West African mainland. The process of colonisation began in the Niger Delta to conquer the river basin and drain its resources (Fanchette, 2006). This was possible because the Niger River flows through low-gradient terrain and is not severely affected by floods. It was an

easily navigable river, and 40 ethnic communities lived along its banks. Each community had its own territory and engaged in various activities, such as farming, fishing, and trade. It was a perfect example of 'fluvial society'. The communities in this delta developed independently, with little help from engineers or the state. Local kings built city-states on the mouths of the various branches of the river. Those cities and states were the places where trade in resources, including enslaved people, flourished.

At first, the colonisers did not take the initiative to build infrastructure to develop this region. They were only interested in draining the resources through the waterways. However, the local river trade, which was based on communities trading with one another, was severely affected by the British colonisers. They took control of all trade in the entire delta (both upper and lower reaches), including enslaved people, from the earlier local kingdoms of coastal city-states. City-states located at the mouths of rivers served as intermediaries, draining resources from the delta and handing them over to the colonisers for export to the outer world. The city-states lacked the capacity to conduct international trade via ocean routes.

After Nigeria's independence in the 1960s, companies like British Petroleum and Shell began drilling wells to extract petrol across the delta, destroying the original habitat, including the houses and farmlands of local communities. Consequently, a legacy of violence started in Nigeria. Extracting more oil, transporting it through pipelines across land, paying the host communities (where petrol is

extracted), and oil leakage and stealing have caused a lot of conflicts and violence, which continues till now, destroying a rich trading delta that was developed using an open fluvial system. The environmental and social costs of the oil industry are very high and have altered the future course of the Niger Delta. This delta can also be considered a collapsed or dead delta.

- GS: What was your experience when you went and observed a different kind of delta, like the Ganga–Brahmaputra–Meghna (GBM) Delta?

- ❖ SF: I was excited to observe the GBM delta, because it is the biggest delta in the world and is created by the confluence of three big and mighty rivers. In the GBM delta, Bangladesh is entirely a delta. This is the only such case in the world. Most other deltas are just parts of a country, but in this case, they make up the whole country. The country's economy and territorial development are both linked to the delta and its water management. The GBM delta is a place that reflects the compound hazards of flood, cyclone, and erosion. It floods for many reasons, such as heavy monsoon rain, massive tidal waves, and cyclonic events. Everything is at its extreme in this delta—the scale of the flood and the loss of lives and resources, water conflict between countries due to the partition, and the involvement of international agencies. These agencies were involved earlier to alleviate poverty, for so-called development initiatives, and now in the name of climate change. Bangladesh is known as the cemetery of failed embankment

projects by Western countries, and is now considered by international funding and donor agencies as a laboratory for climate change adaptation.

- GS: What is your opinion on the development of a discourse crisis by international agencies on deltas, through climate change?

- ❖ SF: After extensive reading about climate change adaptation in the GBM, I realised that the subject is highly biased by the climate change narratives. There are many other issues to consider, but climate change commands the whole attention in delta research. It is a way to hide the mismanagement of the delta in the name of development and to distract people from the real causes of the vulnerabilities in the GBM delta to raise funds for research and for so-called development projects. Deltas have to adapt to future hazards, and to ensure that kind of preparedness, we need to analyse the causes of these hazards more effectively. By giving so much importance to climate change issues such as sea level rise, increased frequency of cyclones and floods, changes in the rainfall regime, etc., we justify our hard infrastructure-based development initiatives and the mismanagement of the delta. By following developers' and experts' suggestions, such as introducing shrimp farming as an alternative livelihood and building higher dykes, we are increasing hazards to a large extent rather than reducing those.

The considerable environmental repercussions of the so-called development in river basins must be studied and disseminated. Such repercussions include the

construction of neoliberal cities characterised by high-rise buildings and extensive groundwater pumping, the construction of dams that alter the siltation regime, increase saline water intrusion, and riverbank and coastal erosion. Delta ecologies are highly complex, and we have substantially modified them. We are now facing the double exposure to environmental externalities and climate change. We can give an example here. The subsidence rate in deltas is higher than the rate of sea-level rise. This is happening because there is not enough silt behind the dykes, and groundwater pumping is extensive. However, very few experts mention this when they discuss climate change and rising sea levels.

- GS: What are you proposing to do, to give us some hope, based on your extensive knowledge of the deltas around the world?

- ❖ SF: For more than 40 years, I have been engaged in understanding deltas and their territorial dynamics. Now is the time for me to write a book using the comprehensive knowledge I have gathered through research into different deltas around the world. I have started writing it, and the central questions of the book are: Why are the Asian and African deltas endangered and facing enormous social and environmental crises, even though they are the richest regions of their countries, producing rice and cereals, and hosting large metropolises? Why do their national governments, along with international agencies, implement development policies that increase the vulnerability of these deltas, risking the collapse of the entire hydraulic structure? It is

like killing the hen that lays golden eggs! I hope my book will offer some hope by showcasing cases of people developing strategies based on local environmental knowledge and water-related wisdom to minimise the devastating impacts of rivers and their deltas.

- GS: What would you like to say about the future of deltas?

- ❖ SF: The only hope is to accept our failure to control nature and to identify all the misdeeds we have committed in the deltas. Only when we accept our failures and mismanagement can we hope to save the deltas, which were the cradle of human civilisations. Now, we must address the root causes of the vulnerabilities we have created in the deltas in the name of development and management, to profit from the resources of deltas, especially by separating water from the land of these soaking ecologies, and start thinking about reversing those destructive processes. We need to move away from the river and water control approach and embrace the 'living with the river' approach by accepting the idea that the river not only gives but also takes from us.

References

Kaida, Y. (2000). *Agrarian versus mercantile deltas: Characterising the Chao Phraya delta in the six great deltas in monsoon Asia* [Symposium]. The Chao Phraya Delta: Historical Development,

Dynamics and Challenges of Thailand's Rice Bowl, symposium Kasetsart Univ., Ird, Chulalongkorn Univ. and Kyoto Univ., Bangkok, décembre.

Bourdeaux, P. (2013). Évocation de la « civilisation fluviale » du delta du Mékong à travers l'étude d'une fondation villageoise consécutive au creusement du canal Rach Già - Hà Tiên dans les années 1930 et la question de l'hydraulique dans la littérature de Son Nam, Les Journées de Tam Dao 2012, AFD, Conférences et Séminaires.

Lacoste, Yves (1976). *La géographie, ça sert d'abord à faire la guerre*. Edition Maspéro.

Rambo, Terry (1973). *A comparison of peasant social systems of northern and southern VietNam*. Southern Illinois University Center for Vietnamese Studies.

Taylor, Philip (2014). *The Khmer lands of Vietnam: Environment, cosmology and sovereignty*. NUS Press, 2014, xviii + 316 pages.

Fanchette, Sylvie (2006). Le delta du Niger (Nigeria): rivalités de pouvoir, revendications territoriales et exploitation pétrolière ou les ferments de la violence. *Revue Herodote* n° 121, pp. 190–220.