

HIGHLAND AQUATIC RESOURCES CONSERVATION AND SUSTAINABLE DEVELOPMENT: LITERATURE REVIEW

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INTRODUCTION

The aim of this literature review is to evaluate current scholarship relevant to the Highland Aquatic Resources Conservation and Sustainable Development project. In doing so it engages with three primary bodies of literature. This includes firstly, studies concerned with understanding rural livelihoods, particularly in the three countries encompassed in this project; secondly, literature associated with access to common property ecosystems which of course, include aquatic resources; and finally, scholarship which is concerned with how gender and age impact both livelihood dynamics and the utilization of ecosystems.

In doing so, it highlights the need to firstly, expand the scope of the original Sustainable Livelihoods approach to engage with issues of class stratification and power, particularly when understanding variations in household livelihood strategy. Such an understanding offers richer insights into how differentiated households utilize natural resources such as aquatic ecosystems, and the degree to which they depend upon them. An engagement with structural power relations can also offer a richer understanding of what conditions access to natural resources, the utilities households yield from them, and the sustainability of current livelihood activities. Secondly, this review has revealed how the additional axes of gender and age generate further forms of livelihood stratification. Divisions between households are thus supplemented by divisions within households themselves, whereby women, men, boys and girls are unequally endowed in terms of livelihood resources, and thus pursue different livelihood activities. This inevitably encourages gender or age specific interactions and levels of dependence upon ecosystem resources.

STRATIFICATION IN HOUSEHOLD LIVELIHOOD STRATEGY

LIVELIHOOD STATIFICATION, POWER AND SOCIAL STRUCTURES

There is considerable variation in livelihood strategies in any majority world setting, and there is likely to be considerable variation in the degree to which individuals or households are dependent upon aquatic ecosystems. How does one go about analyzing these livelihood strategies? Before examining the intra-household gender and age dynamics of those who utilize aquatic resources, it is necessary to understand the variations in overall livelihood strategy between households, and the associated stratification within communities. Birch-Thomsen et al (2001) divides livelihood strategies into three types. An 'accumulation strategy', applies to households that are commercialized with a high income and reinvestment of profits to expand their asset base. A 'peasant strategy' on the other hand, entails limited market participation and subsistence orientation. Finally, a 'coping strategy', applies to households that struggle

to meet their minimum subsistence needs, with limited income and dependence upon common property resources.

However, what are the processes which condition which livelihood strategy a household may choose to pursue? A central methodology of the Sustainable Livelihood Approach is to examine the different types of 'livelihood resource' or 'assets' available to households or individuals (Moser, 1998; Scoones, 1998). Scoones categorizes these livelihood resources as: *economic capital*, such as money and other assets; *human capital*, such as knowledge and education; *social capital* such as networks of mutual support; and finally *natural capital* such as land and multiple ecosystem services. A particular livelihood strategy is an outcome of the different combinations of assets that one has access to (Scoones, 1998). Resources derived from aquatic ecosystems are thus a form of 'natural' capital. While this asset framework represents one method of better understanding the livelihood opportunities available to households, it has been interpreted in multiple ways, and certain concepts such as that of 'social capital', have been subject to considerable critique (see de Filippis, 2001; Fine, 2001; Harriss, 1982; Rankin, 2004). It is therefore sufficient for the scholar to talk more loosely of livelihood resources as the material and social resources which shape livelihood options, without attempting to categories them into a pre-ordained framework.

In order to understand how and why ecosystems are utilized in household livelihood strategies one must examine the full range of livelihood resources available to each actor. The discipline of political ecology however, has argued that the utilization of environmental resources by different social groups can not be understood without a deeper understanding of structural power relations (Blaike & Brookfield, 1987; Peet & Watts, 1993; Simon, 2004). Scoones (2009) argues that the original sustainable livelihoods framework must be expanded to acknowledge the *structural bases of power*. Such an approach, grounded in political economy, requires an engagement with the entrenched social relations which mediate access to different livelihood resources in given contexts. These multi-scalar structures which shape households capacity to accumulate, have been well documented in the field of development studies (Bernstein & Byres, 2001; de Janvry, 1981; Deere & de-Janvry, 1979; Start & Johnson, 2004). By understanding the structural roots of social stratification and poverty, one can better understand why households utilize ecosystems in particular ways, and identify more appropriate management plans which will not undermine vulnerable livelihoods.

So what are the structural processes which mediate a households' access to assets and thus their overall livelihood strategy? Firstly, there are class relations. In Marxian political economy, one livelihood resource, namely the means of production, which include land and machinery, play a central role in shaping access to other livelihood resources in both capitalist and non-capitalist economies. To Marx (1974), access to the means of production has a tendency to determine the capacity of a household to control the labor process and retain their surplus product, i.e. what remains in the household

once subsistence needs have been met. This in turn determines whether or not they can accumulate. In rural economies, rent is often one of the primary mechanisms of surplus appropriation, and is intricately connected with access to land (Bhaduri, 1981; Bharadwaj, 1985). There may however be other mechanisms through which a household has 'surplus' appropriated which is not necessarily tied to accessing the means of production, for example, extortionate interest on loans (usury) or unequal exchange in markets (Bharadwaj, 1985; Deere & de-Janvry, 1979; Harriss-White, 1996).

Another structural process which mediates access to assets falls within the non-economic realm, in particular that of politics (Scoones, 2009). Firstly, property regimes such as those associated with land tenure often lie behind unequal access to the means of production. Secondly, political power can be exercised directly by some individuals or households to strengthen their livelihoods, often at the expense of others. For example, one's political connections can be used to exercise leverage over distribution of state and non-state resources, a process which may well be connected with other axes of power such as class (Bista, 1991; Harriss-White, 2005; Harriss, 2002; Platteau & Abraham, 2002). Similarly, ideological relations such as caste or ethnicity can be used to normalize social inequalities or enhance one's access to political power (Rankin, 2004).

UNDERSTANDING SOCIAL STRATIFICATION: INDIA, VIETNAM AND CHINA

Social structures and class relations in South Asia

So what are the entrenched social structures which shape livelihood strategies across the three field sites? There is extensive literature on rural livelihoods in India and the broader South Asian region. Inequality in access to land resources is particularly acute in this context, with implications for how the rural poor interact with ecosystems.

The origin of social stratification within India's rural population is extremely complex and subject to considerable geographical variation. However, certain historical processes played a disproportionate role, such as the land revenue collection system of the pre-colonial period. During Mughal rule, land tax was collected by state officials. However, following the decline of the Mughal empire in the 1700s, these tax collectors gradually developed into a powerful hereditary land owning class (Banerjee & Iyer, 2005). Land revenue subsequently became a major source of revenue for the British during the early colonial period. There were three systems of tax collection which varied according to the choice of individual administrators and numerous political factors (Banerjee & Iyer, 2005). Under the *raiyatwari* system, individual cultivators paid tax directly to the state. Inequality was less severe in the regions of north-west India where this system was prevalent. The *mahalwari* system on the other hand,

entailed village bodies (which jointly owned the village) collecting the revenue. In some areas only a single person was on the village body, and thus such individuals became a de-facto landlord class. The system which was most significant in driving social stratification however, was the *zamidari* system, which was particularly prevalent in regions of eastern India (Banerjee & Iyer, 2005). Under this arrangement, revenue collection rights were granted directly to the pre-existing landlord class. Landlords could possess the land of peasants who did not meet payment requirements and could retain whatever remained in revenue, after paying the British. The landlord-imperialist alliance yielded the *zamindars* considerable economic and political power and land inequality intensified in these areas (Alavi, 1990; Banerjee & Iyer, 2005).

During the colonial period there was also a destruction of domestic industry, as rural areas were subject to uncontrolled imports of manufactured from Europe. This deepened the dependence of the rural population on landlords and undermined the organic development of capitalist industry in rural areas (Alavi, 1975, 1990; Omvedt, 1990). The economy of the country as a whole became skewed to the production of food and raw materials for the imperialist economy. Industrial development in India itself remained limited due to its export orientation under colonialism, whereby agricultural production was orientated to producing food and raw materials for the imperialist economies (Alavi, 1975, 1990; Omvedt, 1990).

Following independence, there was limited industrial development, but it remained distorted with few forward and backwards linkages, dominance of foreign capital and an outflow of profits to the industrialized core (Alavi, 1990). Non-agricultural livelihood opportunities in rural areas remain limited. However, there were some efforts to boost rural agrarian development. The old systems of revenue collection were abolished, and today land revenue collection is low. Furthermore, land reforms were implemented across the country to limit ceilings of individual landlords (Banerjee & Iyer, 2005; Beseley & Burgess, 2000). Nevertheless, the legacy of the historical revenue collection apparatus continues to structure livelihoods, particularly in the former *zamindari* areas. Many landed elites were been able to mobilize their political power and influence to avoid the land reform process in these regions, often distributing their land to their close kin (Beseley & Burgess, 2000). Furthermore, land remains a profitable source of investment for urban elites, intensifying inequality in rural areas (Patnaik, 1999).

The economic system persisting in former *zamindari* regions such as West Bengal and Bihar has been termed 'semi-feudal' in character (Bhaduri, 1973, 1977, 1986; Bharadwaj, 1985; Rodgers & Rodgers, 2001). A vast strata of landless farmers are obliged to work either as casual laborers for larger landlords, or enter sharecropping arrangements to subsist, whereby land is rented in return for a considerable portion of the crop which is paid to the landlord as rent (Bhaduri, 1973; Thorner, 1982). The high rents for sharecroppers and low wages for laborers impede households from

accumulating and investing on their land to boost production, causing considerable economic insecurity. As their land is not owned, tenants have few incentives to invest in new technologies, resulting in low levels of productivity.

A number of studies have demonstrated how the cycle of poverty is deepened through the sphere of exchange (Bharadwaj, 1985; Crow & Murshid, 1994; Harriss-White, 1996). All households have cash as well as food needs, and thus must access 'economic capital'. However, this often obliges landless laborer and tenant households to take loans from money lenders at extortionate rates of interest. Furthermore, to meet urgent cash needs, farming households often sell their crops at highly unfavorable prices, a process which is known as 'distress commercialization', whereby the seller has limited bargaining power (Bharadwaj, 1985). This often occurs when produce markets are interlinked with other markets such as credit, a common phenomenon in South Asia. Poorer farmers who are compelled to take loans from merchants must repay in crop after the harvest. Aside from high interest rates, the price at which crops are bought in these contexts is often far below the competitive market rate, acting as an additional form of 'concealed' interest (Bhaduri, 1986; Crow & Murshid, 1994).

Many *zamindari* areas were in more peripheral parts of South Asia, away from the industrial centers, and today they remain less urbanized than the non-*zamindari* regions (Kapur & Kim, 2006). Given the limited industrial base in such regions, the alternative sources of income outside agriculture are limited (Kapur & Kim, 2006). With a lack of alternative livelihood options, few can raise the capital to access the land market. Furthermore, the high competition for tenancies and employment from within this vast pauperized base of the agrarian structure forces up rents and depresses wages, reinforcing the power of landlords, money lenders and merchants (Bharadwaj, 1985).

In more 'developed' regions of India, including the districts not subject to the *zamindari* system in the North-West, agricultural productivity and technological development is considerably higher (Banerjee & Iyer, 2005; Kapur & Kim, 2006). Many of such regions benefited from the so called 'Green Revolution' in the 1960s whereby high yielding varieties of seeds significantly increased agricultural outputs and transformed the rural economy (Kapur & Kim, 2006). Sharecropping is less common, and many farmers utilize capital intensive methods, producing extensively for the market using advanced methods (Byres, 1981; Ito, 2002; Niazi, 2004). However, in these more commercialized economies, new livelihood and accumulation opportunities are not necessarily available to all households. Poorer peasants who are often in debt can rarely afford new technologies or withstand the risks involved, even those who own their own land. Meanwhile, new profit opportunities for wealthier farmers increase the incentives for them to increase their holdings and buy what little land remains in the hands of poorer peasants. This inevitable leads sets forth a process of differentiation whereby poorer peasants sell their land to become laborers for the emerging class of large commercial producers (Byres, 1981; Ito, 2002; Niazi, 2004).

Economic liberalization has further intensified inequality in rural India (Patnaik, 2007). Intensified inequality in this context is not always characterized by 'natural' differentiation, but extra-economic coercion whereby peasants are displaced from their land. In contemporary India for example, this is characterized by the appropriation of land for capitalist investment and the privatization of common property resources. In India, dispossession of peasants can for example, make way for non-agricultural services in Special Economic Zones (Patnaik, 2007). At the same time, capital is increasingly expanding into peripheral regions of South Asia where semi-feudal relations persist (Sugden, 2009b). However, rather than transforming social relations as has occurred in parts of Northwest India, it takes advantage of the vast pool of impoverished sharecroppers and landless laborers who are willing to work for extremely low wages. This actually reinforces the prevailing semi-feudal social structure (Sugden, 2009a).

Both 'capitalist' and feudal forms of land inequality are reproduced through the deeply entrenched ideologies of caste. Historically, feudal elites such as landlords could legitimate their control over land and the agricultural surplus by setting up a status order against the reality of class relationships. Caste acts an "ideological screen" which hides the social reality which has evolved over Indian history with shifts in the character of class power (Meillassoux, 1973; Singh, 2008). Caste plays a more direct role in individual livelihoods through the patron-client *jajamani* networks of exchange. Under this system, households specializing in particular trades are bound by material obligations by a 'patron' from a higher caste (Meillassoux, 1973; Rankin, 2004; Vasavi, 1998). In return, the patron grants their clients the means of subsistence, protection and gifts. Although this can be of subsistence value in the short term, in the long term it reproduces material and ideological inequalities. By lower castes accepting 'gifts' from those higher in the hierarchy under the guise of moral obligation, mechanisms of exploitation are camouflaged (Rankin, 2004; Vasavi, 1998).

Personalized social connections associated with caste can also be used to enhance one's livelihood at the expense of others. Harriss-White's (1996) study in Tamil Nadu, investigates how the transaction costs for a merchant elite are lowered due to the often caste based social networks that provide them with access to exclusive, favorable contracts. Similarly, Jeffery and Lerche (2000) demonstrate how wealthy farmers in Uttar Pradesh utilize their caste connections in local government institutions to lobby the local state to act in their favor. This can for example, allow them access to irrigation and credit programs that are meant for poorer farmers (Jeffrey & Lerche, 2000), or to lucrative marketing deals for their sugarcane at the state run mills (Jeffrey, 2002).

Social structures and class relations in Vietnam

The dynamics of land ownership and social stratification in Vietnam is considerably different from the Indian context given the country's recent socialist history. However,

the pre-independence history of the country bears many similarities. Land inequality was severe even before the French colonization, particularly from the 1700s onwards. As with India, the revenue collection apparatus by the centralized state played a significant role in driving social stratification. A share of village output was distributed to the emperor in return for military protection, maintenance of law and order and construction of public works (Wiegersma, 1982).

A sizeable landlord class, many of whom were state functionaries such as Mandarins, were granted private holdings in payment for their service (Dao, 1993; Wiegersma, 1982). They were able to accumulate the holdings of peasants who were unable to pay their taxes and were compelled to sell their assets. Many peasants thus worked as sharecroppers for the landlords (Dao, 1993). Aside from tenancy, there were two main types of tenure, both individual private plots where the household had the right to the harvest so long as tax was paid, and communally owned plots (Dao, 1993; Wiegersma, 1982). In the northern highlands, individual plots were often the upland fields, while wet rice cultivation was under communal ownership (Sikor, 2001). Although communal plots were periodically distributed to household heads to oversee their cultivation, labour was often shared with neighbors and the harvest could not be retained by the assigned household (Dao, 1993; Wiegersma, 1982). On *cong dien* communal lands, over which the emperor had considerable rights, the harvest from each allocated plot had a particular purpose, such as to pay for the army, administration or temple guardians. Plots were also given away to notables and functionaries as payment for their services. On *Tu dan dien* lands, over which village had most control, the cultivating household had to set aside the harvest for community purposes, such as to pay for village ceremonies (Wiegersma, 1982).

Communal and abandoned lands were confiscated under French colonial rule, and auctioned at a low price to the colonizers and their local collaborators, many of whom were from the traditional aristocracy. This intensified land inequality (Dao, 1993). Sharecropping for landlords became an important element of rural livelihoods, and as in contemporary India, rents were extortionate (Dao, 1993).

Following independence from the French in the 1950s, the North pursued land redistribution from large landlords to landless peasants (Kerkvliet, 2006; Sikor, 2002). This was later followed by a policy of collectivization whereby land, labor and other resources would be shared. The collectivization drive was limited primarily to rice and cassava cultivation (Sikor, 2001). Redistribution and collectivization was subsequently followed in the South following reunification. The livelihood strategies of members of collective farms were based upon them receiving work points in accordance with how much labor they had performed. Points were converted into shares of rice, food and money (Hue & Scott, 2007; Kerkvliet, 2006).

Using a case study from the north-western highlands, Sikor (2001) suggests that under collective agriculture differentiation between households in terms of livelihood security largely followed the family cycle. Labor capacity determined the allocation of work on the collective and therefore the share of the output. It also determined whether or not they could diversify their livelihood strategy to work outside the collective. Very young couples who had recently separated from the family had the least disposable labor, and thus were often the poorest. As households matured, the labor capacity increased and they could increase the amount of work on the collective and diversify their livelihood by working off the land. The accumulation of wealth over time allowed them to invest in livestock and housing. Although there were inequalities, they were relatively small, and the primary asset, wet rice land, was under collective control and was thus distributed equally. Most households during the socialist period were able to meet similar level of food security.

However, by 1980s, economic problems facing the cooperative farms, combined with a growing influence of neo-liberalism, led to a government policy of liberalization or *doi moi*, literally 'renovation' (Hue, 2008). Decollectivisation of agriculture was a central element of this process. This paralleled a broader process of economic liberalization. Both processes led to an increasingly stratified society with growing class inequalities (Akram-Lodhi, 2005; Hue & Scott, 2007).

However, despite decollectivisation, some 'socialist' elements remain in place (Kerkvliet, 2006). Land for agriculture or aquaculture can not be privately owned, and the state is the official landlord. Instead it is given to households on a long term lease. After 20 years (50 years for land with perennial crops) the lease can be renewed so long as the household can prove he still needs the farm. However, adjustments can be made to maintain relative equality and there remain ceilings on the maximum amount of land a household can hold (Kerkvliet, 2006). Furthermore, collective ownership of lands persists in many minority regions such as the central highlands (Kerkvliet, 2006) and northern highlands (Sikor, 2001, 2002). Commodification of land is perceived as being against many minority communities values, for whom land is village property, not that of the household or individual. Or example, wet rice fields remained in collective control in the northern highlands (Sikor, 2001, 2002). As of today, each household is allocated a plot to oversee for a period of a few years, and labor is shared. All households are subsequently entitled to a share of the total collective paddy in accordance with the level of labor contribution (Sikor, 2001).

Sikor (2001) notes however that despite the initial equitable allocation of the means of production to each household following decollectivisation and persisting communal farming, growing inequality has been observed across Vietnam. In the north-western highlands for example, family cycle remains important following decollectivisation in driving stratification. Households with more labor can increase the income from collective rice farming and can also increase the accumulation of livestock and upland

fields which were privately owned. Surplus can also be invested in aquaculture and high value agricultural inputs, not to mention cultural capital ‘prestige’ investments (Sikor, 2001).

In fact, changes in the macro-economic structure under economic liberalization have encouraged differentiation independent of the family cycle. Corn cultivation for example, has offered new opportunities to generate significant surpluses as it did not require the same amount of labor as rice cultivation and livestock rearing which was preferred by older generation. Even young households with little labor could generate significant wealth comparable to their older counterparts (Sikor, 2001). Furthermore, the new macro-economic structure and privatisation of land has increased risks for households, particularly those with lower levels of skills. There are now growing differences between households at the same stage in the family cycle (Sikor, 2001).

Drawing on four case studies, Akram-Lodhi (2005) even points to expanding class stratification comparable to what has been observed in the Indian context in some regions such as the river deltas. There is an emerging class of rich peasants who are commercialised, make intensive use of hired labour and equipment, and have high productivity. Alongside the large stratum of small peasants there is an expanding class of landless wage labourers. Landlessness in Vietnam has increased from 8.3% in 1993 to 18.9% in 2002 (Akram-Lodhi, 2005). A significant factor driving this trend are distress sales of land due to indebtedness, a result of formal credit facilities being made available in the early 1990s. Land may also be sold due to output failures and ill health, not to mention the increased prosperity of an accumulating minority who are willing to buy up the land of their poorer counterparts. There is even evidence that sharecropping has returned to some regions (Akram-Lodhi, 2005).

Furthermore, despite the persisting socialist elements of the government, as with India, neo-liberal globalization has led to the increased displacement of households from their land (Kerkvliet, 2006). This is facilitated by the fact that the state remains the ultimate land owner and can justify appropriation of land on grounds of public good and national modernization. Often land is given away for industrial or other ventures utilizing private capital, resulting in severe livelihood stress for displaced households (Kerkvliet, 2006). What about those small peasants who *have* retained their means of production? The evidence suggests that most can not achieve comparable rates of productivity to their wealthier counterparts given their low saleable surplus and capacity to invest in new technologies (Akram-Lodhi, 2005).

Another axes of differentiation in the post-socialist period is based upon political power and patronage. As with India, favorable connections with the local state is often central to shaping access to livelihood resources, with local party cadres often yielding disproportionate power (Luong & Unger, 1998).

Social structures and class relations in China

As with Vietnam, the numerous pre-revolutionary states under the Song, Ming and Qing dynasty from the 10th to early 20th century, played a powerful role over the local economy. Although it is impossible to generalize a long complex history, there is evidence that private property rights to land were perhaps more developed than Vietnam. By the 18th century Feuerwerker (1984) estimates that 92% of the land was in ‘private’ rather than ‘state’ hands. Throughout this period there was also evidence that a powerful class of landlords flourished, most of whom either had a position in the bureaucracy of the imperial state or were related to government employees. The power of this class was reinforced through remuneration for administrative tasks such as maintenance of public works such as dams embankments (Feuerwerker, 1984).

The landlord class appropriated a significant portion of the surplus produced by agricultural labour force who worked as tenants and laborers (Feuerwerker, 1984). Through their income from the bureaucracy, money lending and commerce, they were able to increase their wealth and buy up the private plots of individual peasants (Schwartz, 1954). There were also a number large estates or *zhuangyuan*, These local concentrations of wealth were often once empty lands, which were given to the politically privileged (Feuerwerker, 1984). However, there was still a large class of independent owner-cultivators in the pre-revolutionary centuries. For example, land depopulated during the wars of the Ming-Qing transition was redistributed to small peasant households, supporting an independent peasant class (Feuerwerker, 1984).

Nevertheless, land inequality remained a significant axes of social stratification and from the late 19th to early 20th century prior to the Communist victory, Brandt and Sands (1990) estimate that up to a third of land was not owned by farmers but rented. Although there was a burgeoning commercial sector, this had a limited impact on the expansion of output across the economy as a whole. As with India, imported goods had undermined pre-existing cottage industry, and existing factories were established primarily with foreign capital (Schwartz, 1954).

The Communist revolution spurred a dramatic structural transformation. Agriculture was collectivized, and as with Vietnam, the farmers gained an income through a points based system. Luong and Unger (1998) suggest that like Vietnam, economic stratification was associated primarily with the family cycle and the labor capacity of the household ¹. Yan (1992) however, based upon a case study from Heilongjiang province, suggests that position in the ‘bureaucratic rank order’ was also significant in determining one’s relative prosperity. Party cadre had numerous privileges, with favorable access to resources in

¹ Former landlords and rich peasants believed to be hostile to the party in the pre-revolutionary period had now become the poorest social strata and were discriminated in both employment and access to state resources (Yan, 1992).

the bureaucratic redistributive system and more desirable jobs. Although inequalities existed, Luong and Unger (1998) suggests that stratification was lower than Vietnam given that the non-farm economy was less developed in China and there were fewer alternative options for upward mobility.

Agriculture was decollectivised in the 1990s, and field were distributed on a largely egalitarian manner under a lease system similar to Vietnam, termed the ‘Household Contract Responsibility System’ (Eyferth, Ho, & Vermeer, 2003; Luong & Unger, 1998). However, in the changed context, there was rapid rural stratification at an even greater rate than in Vietnam (Luong & Unger, 1998). For the first time, villagers now had new ways of earning money beyond selling grain, and these provided most of the opportunities for individual accumulation. Households with technical expertise and surplus labor now diversified into commercial livestock and aquaculture. Meanwhile, the combination of a market economy and persisting state influence over rural enterprises encouraged extensive rural industrial development in the early years of the reforms (Eyferth et al., 2003). Stratification was intensified as an increasing number of households took up opportunities to send members to work in the non-farm economy, and many migrated to join the construction sector in the growing cities (Luong & Unger, 1998).

Meanwhile, there was increased stratification within the farming population who were still engaged in subsistence oriented grain production (Luong & Unger, 1998). Unlike Vietnam and India, producers in rural China could not be alienated from their land. However, differentiation continued, with some farmers using advanced techniques and investing on their land. Poorer households without moveable assets to use as collateral were often excluded from loans, impeding them from investing (Luong & Unger, 1998). Skills and knowledge also drove differentiation. Interestingly, Yan’s (1992) study from Heilongjiang suggests that many of the households that were poorer during the collective period actually have advantages over other peasants in the market economy. Their previous economic insecurity and exclusion from bureaucratic privilege had obliged them to improve their farming skills to survive.

In the post reform period, village cadre’s political authority has declined significantly. However, their favorable political connections still offer them relative advantages in accumulating wealth over other peasant households (Yan, 1992), perhaps to an even greater degree than Vietnam (Luong & Unger, 1998). Well connected households are able to build up effective patronage networks with local officials. Although the system for agricultural land distribution remains relatively equal, these networks facilitate preferential access to other assets such as orchards and fishponds (Luong & Unger, 1998).

Yan (1992) suggests that there is a dual system of stratification in rural China with a bureaucratic rank order with favorable access to state resources co-existing with market based class order with access to capital. Stratification has been worsened by grain requisition policies which oblige households to supply a certain amount of grain to the state

at a low price. Combined with local taxes, these policies are biased against poorer households (Luong & Unger, 1998; Xiande, 2003).

HOUSEHOLD STRATIFICATION AND UTILISATION OF ECOSYSTEM RESOURCES

Different levels of dependence upon ecosystems

In the context of class stratification and associated power relations outlined above, the overwhelming evidence from throughout the world suggests that land-poor households pursuing 'coping' livelihood strategies are disproportionately dependent upon common property resources (CPRs), including aquatic ecosystems (Agarwal, 1998; Beck & Ghosh, 2000; Dey, 1997; Luttrell, 2006). Beck and Ghosh (2000) argue for example, that 12-13% of poor people's income in India is derived from Common Property Resources. Similarly, even in China in an era of market reforms, a large proportion of the rural population in peripheral regions depend upon traditional use of forest resources for fuel, medicinal herb collection and hunting (Ho, 2006).

Although this dependence of households upon natural resources can increase rates of degradation, there is evidence throughout the majority world of effective indigenous management regimes (Fairhead & Leach, 1996; Johnson, 2004; McCay & Jentoff, 1998)

Binh et al (2008) for example, demonstrate how local people in the central highlands of Vietnam poses extensive indigenous knowledge to minimize soil erosion². Furthermore, in Vietnam's northern highlands in the socialist era, while common property resources were under state control, customary management regimes of the communes ensured that common grazing, river and forest lands were not over-exploited (Hager, 2006).

Degradation of common property ecosystems

Despite the importance of common property ecosystems for poor and food insecure households and their capacity to manage them effectively, the size and quality of these ecosystems is declining significantly throughout the world. This occurs firstly as a consequence of environmental degradation. In India, common property resources have been undermined due to population growth and the expansion of the cultivated area, the establishment of plantations and urbanization. The area of common property resources fell by 45-60% in many states between 1950-1984

² Unfortunately however, these knowledges are being undermined by increased internal migration away from the regions where knowledge's was developed over the generations.

(Agarwal, 1998). The remaining common property ecosystems have also been degraded due to groundwater depletion and commercial ventures such as hydroelectric dams (Agarwal, 1998).

Similar trends are evident in Vietnam. Forest cover decreased from 95% in 1943 to 17% in 1991, and rapid industrialization in the post-socialist era has further intensified the rate of natural resource extraction (Sikor & O'Rourke, 1996). Aquatic ecosystems in particular are being undermined by the growing sectors of food processing and industrial aquaculture, not to mention water control and land reclamation schemes. At the same time, the transfer of decision making to the private sector in the context of economic liberalization is making it easier for industrial enterprises to bypass environmental legislation (Sikor & O'Rourke, 1996).

Market reforms and urban expansion in China have also put pressure on common property ecosystems, with the country becoming one of the world's largest wood exporters. Between the 1984-88 and 1989-93 forest inventories, the forest cover had decreased by 4.54 million hectares, and a further 1.23 million hectares by 1994-1998 (Ho, 2006). Deforestation has also resulted in deserts expanding at a rate of 156,000 hectares per year (Ho, 2006).

Access to common property ecosystems

However, just as the size and biodiversity of the ecosystems of which CPRs comprise have declined, so has *access* to the resources which remain. In this context, it is poor and marginalized households that are disproportionately likely to face direct exclusion from ecosystems. Understanding these dynamics requires an engagement once again, with class relations.

Firstly, institutional arrangements to manage CPRs such as wetlands or forests may directly or indirectly discriminate against poorer communities or work in the favor of those who yield political power (Cleaver, 2001). While institutions such as forest or wetland management regimes often aim to achieve equity in access, political power can be exercised by certain individuals to facilitate access or even bypass rules all together. With regards to groundwater management in Africa, Platteau and Abraham (2002) highlight means through which elite groups may use their status to actively flout rules, or mould institutions in ways that benefit themselves. In this context, cultural ideologies of status prevent powerless groups from asserting their rights or challenging the behavior of community elites. Unfavorable institutional arrangements are accepted through respect for status and a desire to avoid dissent and community disintegration (Platteau & Abraham, 2002).

Secondly, there is an unfortunate trend whereby ecosystem management regimes *directly* exclude poor and vulnerable communities who are viewed as a threat to

environmental sustainability. In this context, a conservation agenda often conflicts with the livelihood needs of communities. Dey's (1997) study in Jaldhapara of North Bengal notes how forest conservation regulations excluded women and poor tribal households who were dependent upon its wood, fodder and aquatic resources.

However, it is not only a conservation agenda that undermines the livelihoods of the rural poor. In an era of globalization, there is an increased tendency for common property resources to be made available for livelihood activities, but in a *privatized* form (Parayil & Tong, 1998). Hardin's (1968) 'tragedy of the commons' discourse has been particularly influential in this regard, suggesting that individual users of common property resources as 'rational' individuals, maximize their use of ecosystems to unsustainable levels. This is because the negative consequences of over-exploitation will be shared across the *entire* community while the benefits will go only to the individual. The implication is that resource users are more likely to sustainably manage privately owned land. Such an understanding of individual behavior, which represents an ideological screen for neo-liberalism, is deeply problematic. Firstly, it suggests that the rural poor are incapable of working together to manage ecosystems sustainably (Parayil & Tong, 1998).

Secondly, as the discussion of land decollectivisation in Vietnam and China above has suggested, privatization of resources which were previously under communal ownership is by no means independent of local class relations. Following liberalization in Vietnam, the privatization of common property ecosystems has not only led to intensified degradation but has undermined the livelihoods of the most vulnerable groups (Hue, 2008; Hue & Scott, 2007). In the Red river basin, mudflats which were historically open access for clam harvesting were 'claimed' by wealthier households with access to nets and equipment by sealing off sections of land. These claims were subsequently officially approved by village officials (Hue, 2008).

Finally, privatization of common property resources can in fact have an opposite, detrimental impact on ecosystem biodiversity. Firstly, land which is privatized is often put forward for commercial use by corporations, whereby the short term profit gains outweigh the long term environmental impact. For example, in Cameroon following structural adjustment, local people's rights to high value forest which was formerly common land was restricted, making way instead for logging firms with unrestricted access (Nguiifo, 1998). Secondly, excluding local people often has the effect of worsening the over-exploitation on the common land by poor and landless classes (Beck & Nesmith, 2000; Ho, 2006; Johnson, 2004), or even forcing them onto more marginal frontier land, as had been observed in the Brazilian Amazon (Parayil & Tong, 1998). Thirdly, privatization often undermines pre-existing ecosystem management regimes. In Vietnam's northern highlands, the privatization of common land whereby plots of forest or grazing land would be allocated to individual households, undermined the traditional management regimes present in the communes (Hager, 2006). The

erosion of collective control, coupled with population growth, encouraged villagers to expand into upland areas set aside as forestry land, further degrading ecosystems (Sikor, 2002). This has been worsened by the recent market expansion and the demand for upland fields for commercial corn cultivation (Sikor, 2002).

Investment capacity and access to ecosystems in a stratified society:

It is important to acknowledge that even when institutions permit poor and landless households *access* to natural resources such as aquatic ecosystems, this does not automatically translate into economic *opportunity*. As Sikor and Nguyen (2007) argue with reference to Vietnam's Central Highlands, whether or not one can benefit from statutory rights to environmental resources is dependent upon one's political and economic resources. The utility of ecosystems for different households is embedded in the broader process of agrarian change and the associated transformations in post-socialist rural class relations. In Vietnam, the government devolved forests to households and local state units in the 1990s for sustainable agricultural and resource harvesting purposes. Forest land which was allocated for agricultural purposes was claimed by clearing the land. However, the size of fields cleared, or the quantity of forest produce which could be harvested from protected forests, depended upon the household's access to capital and labor. Wealthier households could hire in additional labor to clear the forests or purchase the appropriate inputs such as chainsaws. Furthermore, such households that used more advanced techniques could also extract much greater quantities of forest resources (Sikor & Nguyen, 2007).

It is the more capital intensive use of ecosystems which usually offer the greatest financial rewards, but are often not feasible for poorer households. After all, pre-existing livelihood security is necessary for the accumulation of capital which can be reinvested. Commercial aquaculture for example, represents a capital intensive use of wetland ecosystems which disproportionately benefits 'accumulating' households who can afford the necessary inputs. Hue and Scott (2007) examine shrimp production in coastal regions of central Vietnam. Despite the fact that all households in the commune were allocated ponds, those without existing livelihood security were unable to invest. Many eventually sold their ponds to wealthier households with access to financial capital, political power, social networks, and entrepreneurial skills (Hue & Scott, 2007). Similarly processes of stratification were evident in the Red River mangrove ecosystems of northern Vietnam, another site of shrimp production following economic liberalization (Hue, 2008). Aside from aquaculture, an externally funded development project offered households remuneration if they planted mangroves, with the intention of reversing ecological decline in the coastal region. However, again, it was primarily those with access to capital and labour who could benefit from the initiative. The average household categorized as 'rich' was earning 14 times more than the average

'poor' household from the mangrove resources, despite the fact that it is this category that depends the most on these ecosystems (Hue, 2008).

The tendency for capital intensive use of natural resources to be monopolized by wealthier households is particularly significant as these commercial endeavors often have the greatest potential for environmental damage. Birch-Thomsen et al (2001), in a study from Tanzania, suggest that those who already have livelihood security through land and other assets often have the lowest incentive to sustainably use common property ecosystems, as they do not rely on them to the same degree as their poorer counterparts. Indeed, aquaculture in Vietnam is associated with numerous environmental problems including the destruction of landscapes, soil and water pollution from pond effluents, and species invasion. In fact the loss of mangrove ecosystems which had previously absorbed pollutants led eventually to the collapse of the shrimp farming industry in central Vietnam (Hue & Scott, 2007). It is clear therefore that ecosystem degradation can be caused by rural prosperity as much as it can be due to poverty. This is also evident in Herrold-Menzies (2008) study of a wetland in southern China. She demonstrates how in order to limit the over-use of wetland resources, women were offered micro-finance loans to start businesses, creating an alternative source of income. However, the successful pig rearing enterprises which flourished in this context actually had the opposite effect, with women collecting water plants to feed the pigs and animal waste run-off polluting the waters.

INTRA-HOUSEHOLD VARIATION IN LIVELIHOOD STRATEGY

GENDER DIVISIONS AND USE OF ECOSYSTEMS

Just as it is crucial to understand how *households* are differentiated by their assets and capacity to pursue different livelihood strategies, there are important divisions of labor *within* households. Individuals within households may thus pursue individual strategies to subsist *within* the confines of the overall family livelihood strategy.

The first axes of differentiation is that of gender. The dominant gender division of labour in the majority world, whereby women bear the burden of both productive and reproductive tasks but do not retain an equal share of household income, has been well documented (Agarwal, 1998; Benholtd-Thomson, 1982; Deere & de-Janvry, 1979; Deere & Leon de Leal, 1982; Folbre, 1982; Gibson-Graham, 1996; Gibson-Graham, Resnick, & Wolff, 2001). It is crucial however, not to view women as a stand-alone homogenous category with pre-defined socio-economic roles. Instead, a contextual approach is necessary, which is aware of historical-geographical specificities in how women and

men relate to each other, to the environment, and to broader structures of power (Elmhirst & Resurreccion, 2008). Nevertheless, there are two trends which are evident throughout the majority world and deserve particular attention if one is to promote reconciliation between conservation and sustainable livelihoods development.

Firstly, women are the most likely to be engaged in resource harvesting activities from common property ecosystems (Agarwal, 1992, 1998; Elmhirst & Resurreccion, 2008). Beck and Ghosh's (2000) study across 7 West Bengal villages note how women perform a 70 – 78% share of labour in natural resource harvesting from common lands. Even when all household members participate in livelihood activities dependent upon common property resources, there is still differentiation in the particular activities. Gregory et al's (2007) study of highland aquatic resources in Laos notes how only women are involved in aquatic plant collection while it is primarily men who catch frogs, a product which must be collected at night. Similarly, Herrold-Menzies (2008) study from a South China wetland demonstrates that while fishing primarily falls to men, women are responsible for marketing the aquatic produce.

Secondly and perhaps most crucially, women are often disproportionately dependent upon common property resources for their wellbeing. Women in India, as in many majority world countries, perform the greatest share of agricultural labour (Agarwal, 1998). Although this agricultural work is particularly important for household livelihood strategy, women themselves often have little control over the product of their labour (Agarwal, 1998). This stems from the fact that they rarely have ownership to land, the primary source of income. Although inheritance laws allow Indian women to legally own immoveable property, in practice, few take up this right. Their lack of ownership renders them more dependent upon resource harvesting from CPRs, as this is often the only income they are able to *personally* control (Agarwal, 1998).

Similar processes are evident in Vietnam. During pre-colonial and colonial Vietnam, gender relations remained extremely unequal with little participation in political life and no access to land (Hue, 2008; Wiegersma, 1982). Women were dependent upon resource harvesting from common property wetland and forest ecosystems (Hue, 2008). During the socialist era, equality increased significantly, allowing women to participate in public life. Under the collectives women could take control over productive resources, particularly during the war when many men were away from the village. However, during decollectivisation, women were disenfranchised again, as only men were able to claim property rights to land. Women again therefore, became dependent upon natural resources (Hue, 2008).

Of course, women do not only depend upon natural resources for their economic value. Ecosystems often contain gender specific 'non-use' values for users. This is important as a sustainable livelihood should not only offer economic security and resilience, but overall wellbeing, including access to *non-material* benefits. For example, in Uttarakhand, Gururani (2002) explores the cultural values men and women attach to

forests. For example, men's physical work in the pine forests is considered a means through which they assert their masculinity. Similarly, for women, a good performance in their gender specific harvesting roles in the forests can be a source of pride that they are effectively performing their 'feminine' duties. The forests are also valuable to escape from patriarchal norms of the village and are a place of social bonding with other women.

AGE DIVISIONS AND USE OF ECOSYSTEMS

Individuals from different *age* groups may also pursue different livelihood activities, encouraging unique generation specific interactions with ecosystems. In rural majority world contexts, young people make an important contribution to household livelihood strategy in both productive and reproductive tasks. However, like the work of women, it is often undervalued (Panelli, Punch, & Robson, 2007). As with men and women, it is essential for this project to understand the dynamics of young people's livelihood activities, particularly those dependent upon aquatic ecosystems. This is important firstly, so as to better understand how aquatic ecosystems are used; secondly to uncover how these livelihood activities contribute to (or undermine) their wellbeing; and thirdly, to understand the opportunities or impediments to strengthening these livelihood activities.

Certainly children's contribution to the household livelihood strategy is often driven by poverty (Dyson, 2008; Klocker, 2007). It can conflict with their educational needs with limited opportunities to personally retain the income (Chant & Jones, 2005). Children in many majority world countries, like women, bear a disproportionate responsibility for harvesting from common property ecosystems (Katz, 1991). Such tasks which include the collection of fuel wood from forests, and tending livestock on common pastures can be time consuming, dangerous and can involve hard labour (Dyson, 2008). Although young people's responsibility to labour is like that of women, embedded in unequal structural power relations, it is important to note that children are not 'passive' actors. Within the broader structures of class, caste and gender within which they are embedded, they are able to exercise some limited agency, negotiating their work so as to attach it with particular meanings and values (Dyson, 2008; Klocker, 2007; Punch, 2002, 2007; Robson, Bell, & Klocker, 2007). Although the literature relating to ecosystem dependent activities is limited, the meanings young people attach to work have been well documented, offering important lessons (Dyson, 2008; Katz, 1991; Klocker, 2007; Punch, 2007).

For example, Chant and Jones' (2005) study from Ghana and The Gambia suggested that young people feel a compulsion to contribute to family income if they are to make a legitimate claim to an education in the first instance. Indeed fulfilling one's obligations

to the parents is alone a sufficient justification to contribute to household income. Pursuing particular livelihood activities may also be used to assert particular identities and lifestyles and can actually strengthen young people's power within the household as they make the transition to adulthood (Robson et al., 2007). For example, amongst Bolivian rural youth, as with women, few have access to land (Punch, 2002). However, labour migration offers young men in particular a source of personal income and allows them to consume luxury goods and assert a globalised 'modern' identity. By contributing to household income they earn greater decision making power within the households (Punch, 2007). Even for activities within the village, children can find ways to corner some income for themselves. This may include taking limited control over the harvest of a particular piece of their parents land or asking parents for their own animal in return for looking after the household livestock or crops (Punch, 2002, 2007).

Referring more specifically to ecosystem dependent livelihood activities, Dyson (2008) examines children in India's Uttarakhand Himalayas who are responsible for the collection of lichen from high altitude forests. By passing on income to their parents, young men could project an image of responsibility and success, while the income they kept for themselves could be used once again, to purchase consumer goods. The process of lichen collection was also used to demonstrate their masculinity. However, it must be reasserted that the capacity for young people to exercise agency is variable depending upon their position in the social structure. Girls for example yielded few material benefits from lichen collection. However, by being away from the village they could enjoy some freedom with their peers, and transgress the social norms young women were expected to submit to. In fact, play was more important to many girls than the actual process of resource harvesting (Dyson, 2008).

This capacity for young people to combine work with recreation has been highlighted also by Punch (2003) in a study from Bolivia. Young people found ways to creatively negotiate the labour process, through for example extending the time spent carrying out jobs so they could play as well as work. Katz (1991) identified similar processes in a study from the Sudan. Certain livelihood related tasks such as the trapping of animals were equally important for their entertainment aspect. However, the ability of young people to yield such non-use values from ecosystem dependent livelihood activities, is again, influenced by one's position in the social structure. Dyson (2008) demonstrates how in the Uttarakhand Himalaya, lichen collection does not have the same meanings for low caste girls as it does for their higher caste counterparts. The greater economic insecurity means that they usually collect lichen together with older family members and are under much greater pressure to maximize their labour time, with few opportunities for recreation.

ECOSYSTEM CHANGE, EXCLUSION FROM NATURAL RESOURCES AND GENDER/AGE LIVELIHOOD STRATEGIES

Given the importance of common resources to women and young people, they are disproportionately impacted by the environmental degradation which is reducing the size and biodiversity of CPRs (Agarwal, 1998; Katz, 2009). It is not only environmental change however, which is undermining the natural resources livelihood activities of both women and young people. Just as households can be *directly* excluded from common property resources on the grounds of their class position, so also can individuals be excluded along the axes of gender and age. In Hue's (2008) study of Vietnam's Red River basin for example, privatization of what were once common property lands such as mudflats used for the collection of clams, negatively affected women who did not have titles to land. Similarly, the privatization of forest resources in India has directly excluded women and young people who depend upon them (Agarwal, 1992).

The degradation of common property resources or exclusion as a result of privatization decreases women and young people's income and undermines the non-use values acquired from associated livelihood activities. It often has the additional outcome of increasing their work burden as they often must travel further for harvesting activities from the few remaining common property resources (Agarwal, 1992, 1998; Hue, 2008). In Katz's (1991) study from the Sudan, she demonstrates how the clearing of land for a commercial agriculture project has increased the work burden of children who now have to travel twice the distance to collect fuel wood. The non-use values children acquired through the combination of work and play was undermined as a result of their increased work burden (Katz, 1991). Similarly, Hue (2008) notes how some women who were excluded from mudflats were obliged to work as laborers for wealthier households with the capital and connections to claim their own plots or travel long distances to 'unclaimed' mudflats.

Another wider impact of the degradation of ecosystems or exclusion from common property resources is the loss of particular agro-ecological knowledges. Women for example, often have unique environmental understandings given their dependence upon ecosystems. However, degradation coupled with migration leads to a gradual erosion of these knowledges (Agarwal, 1992, 1998; Jewitt, 2000). Livelihood activities undertaken by young people can also offer them agro-ecological knowledges. Katz (1992) also demonstrates how children's interactions with the environment through their every day contribution to livelihood activities can endow them with unique environmental knowledges which can be mobilized in later life. Agro-ecological knowledge is acquired practically through the combined process of work and play and is passed on from older to younger children. It is essential for their socialization and the reproduction of the society as a whole. Aside from environmental knowledge, other

valuable livelihood resources children acquire through work include social networks which can facilitate trade and business and practical occupational skills (Chant & Jones, 2005).

As with poor households, even when women and young people have access to common property resources in principle, they often can not earn as much income from them as their adult or male counterparts. Firstly, they lack the capital to use them in capital intensive ways. Brugere's (2001) study from Vietnam, notes how women in particular face difficulties gaining credit for investment in aquaculture as land is registered in the name of males. Secondly, they lack of access to skills or social networks may reduce their income. Hue's (2008) study of shrimp cultivation in the Red River delta suggests that women who collected aquatic produce were excluded from the social networks of primarily male shrimp traders. They therefore depended upon their own kin-based networks which impeded them from trading with other villages.

GENDER, AGE AND THE MANAGEMENT OF ECOSYSTEMS

The exclusion of women and children from access to ecosystems can be better understood when one observes that their participation in management regimes is often limited. Beck and Ghosh (2000) also give the example of a co-operative which was formed to manage a fishery tank in West Bengal. Although it improved livelihoods and conserved the aquatic ecosystem, membership was mostly men. Women who had previously enjoyed open access before to collect fish, fodder and water lilies were now excluded as they were not members and had limited influence over the rule making process (Beck & Ghosh, 2000).

Despite the efforts of conservation and sustainable development initiatives, it is too often assumed by development institutions that it is in the "rational" interest of marginalized groups to participate, when in fact complex structural factors may prevent them from doing so (Cleaver, 2001). For example, gender ideologies which restrict women to the home, alongside their lack of recognized decision making authority, may discourage them from participating, as Agarwal (1998) demonstrates with regards to Joint Forest Management in India, and Zwarteveld and Neupane's note with regards to irrigation management in Nepal (cf Cleaver, 2001). In meetings themselves, even when marginalized groups do participate, there is a tendency for elites to dominate (Agarwal, 1998; Mosse, 2001; Platteau & Abraham, 2002). Another factor is the high workload of women and young people and limited time to attend meetings, which are often held when they are engaged in domestic chores (Agarwal, 1998; White, 1996).

The failure of women or young people to participate in the management of ecosystems does not only make it more difficult for them to access the resource in question, it can

also deepen gender/age inequalities through more complex means. Hitchcox (1992) examines a drainage scheme around farmlands in coastal Vietnam. This allowed an increase in rice cultivation whereby women perform a disproportionate share of labour. Although this increased household income it significantly increased women's everyday work burden. Harris (2006) identified similar processes following irrigation development in Turkey whereby increased cotton cultivation increased both children's and women's workload.

An additional outcome of exclusion from management regimes is that excluded groups may seek to circumvent rules leading to worsened degradation. Agarwal (1998) demonstrates how women's exclusion from the formal rule making process in India's Joint Forest Management means they have few incentives to comply with the regulations set out by the user groups.

CONCLUSIONS

From the review of the available literature, it is evident that one can only understand the dynamics of rural livelihoods – and how households interact with ecosystems – through an analysis of structural power relations operating at multiple scales. These include both the power relations between households which drive class stratification, and relations within households such as gender and age. Such relations condition to a greater or lesser extent, the degree to which households or individuals depend upon ecosystems, and the accumulation opportunities these resources provide.

It is also evident that both degradation as well as inappropriate management of ecosystems has the potential to exclude vulnerable groups such as landless households, women and young people. Such groups tend to depend disproportionately upon natural common property resources. This does not only impact their livelihood security but has the potential to undermine the non-use values which such environments offer them, impacting their overall wellbeing.

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