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## Concerns about the future of Chinese fisheries based on illegal, unreported and unregulated fishing on the Hanjiang river

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### ABSTRACT

The Hanjiang River is the most developed tributary of the Yangtze River Basin and is an important source of water for the Chinese Middle Route Project of the South-to-North Water Transfer Project. Ecological protection and water quality safety standards of the Hanjiang River have been major concerns for almost a decade. Nevertheless, irrational land use patterns, excessive use of chemical fertilizers and pesticides, extravagant irrigation of farmland with sewage sludge and illegal, unreported and unregulated (IUU) fishing have led to marked deterioration of the water status. Some of the most damaging and frequently used IUU fishing methods on the river include electric fishing, explosive fishing and fishing with toxic chemicals, leading to substantial losses of aquatic biological resources. Traditional government-dominated controls such as arrest of and penalties to illegal fishermen and the prohibition of the sale and use of electric fishing tools have failed in practice to restrict IUU fishing in the Hanjiang River basin. This important fishing area which is a vital source of scarce drinking water for north China and proposals and implementation of countermeasures for the protection and sustainable development of the river are urgently required. The aim of the present study is to clarify the serious problem of IUU fishing, especially electric fishing, in the Hanjiang River and to explore effective solutions. Coordination and supervision of rational and sustainable fishing practices is required through appropriate legal controls. The confrontation with IUU fishing may be progressively brought under control with the help of new and modified fisheries laws and regulations such as much higher penalties, more rigorous sanctioning, more careful investigation of electric fishing activities, more professional enforcement officers, greater public awareness, more systematic supervision and more successful cooperation between the government and the local population.

### 1. Introduction

Illegal, unreported and unregulated (IUU) fishing is an important global problem jeopardizing ecosystems, food security, and livelihoods around the world following global economic development and is spreading in both marine and inland waters in China. The World Bank reports that the intensification of the global fishing effort has caused economic losses of 50 billion US dollars annually in 2010 (Anticamara et al., 2011). IUU fishing causes detrimental environmental and social impacts amounting to a total loss of 10–23.5 billion US dollars worldwide according to the FAO, with a total catch of 11–26 million tonnes (Agnew et al., 2008) and may account for more than 30% of the entire global fisheries.

In March 2001 IUU was initially defined in a report entitled

‘International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing’ by the twenty-fourth Session of the Committee on Fisheries (COFI). ‘Illegal Fishing’ refers to fishing carried out in the territorial waters of a state without state permission or in contravention of its laws, and to fishing on the high seas by a state-flagged vessel in contravention of laws and obligations agreed to between two or more states through a Regional Fisheries Management Organization (RFMO) (Marine Resources Assessment Group, 2008). ‘Unreported Fishing’ refers to the non-reporting or misreporting of catches in contravention of national or regional regulations and procedures and ‘Unregulated Fishing’ is fishing by vessels without nationality or by state-flagged vessels in waters where the state is not party to an RFMO and fishing in waters where no management measures exist and which is inconsistent with international responsibilities

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to conserve fish stocks (Marine Resources Assessment Group, 2008; Liddick 2011). According to the International Criminal Police Organization (INTERPOL), ‘Wildlife crime is the taking, trading, exploiting or possessing of the world’s wild flora and fauna in contravention of national and international laws’ (INTERPOL, 2010), and a significant role is played by INTERPOL in ongoing global efforts to identify, locate, arrest and prosecute the top offenders involved in IUU fishing and related fisheries crimes (INTERPOL, 2015).

Illegal and unreported fishing contributes to overexploitation of fish stocks and is a hindrance to the recovery of fish populations and ecosystems (Agnew et al., 2009). There are more incentives to fish illegally (FAO, 2000) as the demand for fish in the market increases and effort limits are being imposed. Significant correlation between governance and the level of illegal fishing can be found from the data over the last several decades in which developing countries are most at risk from illegal fishing, for example in west Africa (Agnew et al., 2009). Data on illegal fishing activities have been described in the media (e.g. Intrafish, FIS), fisheries management reports and peer-reviewed literature (Pitcher et al., 2002) and are spatially referenced by FAO area or sub-areas depending on the level of detail provided (Sumaila et al., 2006). Although there have been some successes in reducing the level of illegal fishing in some areas, these developments are relatively recent and follow growing international focus on the problem (Agnew et al., 2009).

Unfortunately, the tendency towards secrecy in fisheries data and the near complete disregard for public accountability in the use of public resources have not improved for many years (Mallory 2013). The emergence and spread of IUU fishing and the uncertainty of fisheries have resulted in the practical difficulty of obtaining the true conditions of fisheries by governments and research scientists in the formulation and implementation of adaptation policies and measures, and in the achievement of management objectives and sustainable development of fisheries. Although information on the harm caused by IUU fishing has been disseminated globally, the region most seriously affected by IUU fishing is West Africa, where illegal fishing amounts to the equivalent of 65% of the legal reported catch and raises serious concern for food security and for the economies in the region (Dombouya et al., 2017). It represents a potential risk to the food security and livelihoods of the people in the coastal areas of Africa because of the high total consumption of animal proteins and because over 10 million people depend on fishing, fish farming, fish processing and associated value chain activities (Government of Ethiopia Report, 2011).

Despite the availability of fisheries statistics at national level, reported catches account for only a portion of total removals by fisheries (Pauly and Zeller, 2016). The assessment of fishery resources rely on catch data or government records of fishery capacity and capture data rather than all data including IUU fishing, and the resulting assessments deviate greatly from the actual resources (Belhabib et al., 2014; Pauly et al., 2014). Most studies assessing illegal fishing have focussed on large-scale fisheries, but unreported and unregulated fisheries commonly include small-scale artisanal and non-commercial subsistence sectors with stable or gradually increasing catches which benefit more people directly, support more livelihoods locally and generally have fewer negative environmental or socio-economic side-effects (Zeller et al., 2016). The reported depression in the population of the Patagonian tooth fish is partly due to erroneous data on fishery capture so that concerns have been raised over IUU fishing by experts, fisheries managers, government organizations, regional or global inter-governmental organizations, non-governmental organizations and fisheries industries with the possibility of a decline or ultimately the collapse of the fishery due to misunderstandings about the capacity of fisheries and capture assessment results (Miller et al., 2003).

The ‘International Plan of Action to Prevent, Deter and Eliminate IUU Fishing, IPOA-IUU’ was developed by the FAO in 2001 to call for necessary measures to end IUU fishing (FAO, 2001). The International Tribunal for the Law of the Sea (ITLOS) delivered its first-ever Advisory

Opinion on a request submitted by the Sub-Regional Fisheries Commission, a regional fisheries organization of seven west African states, on 2 April 2015 to improve supervision and coordination by different countries (Becker, 2015). The European Union (EU) is subject to the same legal regime as flag states with respect to IUU fishing, provided that the international organization has made an undertaking in accordance with Annex IX to the United Nations Convention on the Law of the Sea (UNCLOS) to accept the rights and obligations of states under the UNCLOS in respect of matters relating to which competence has been transferred to the international organization by its Member States which are Parties to the Convention (Tuerk, 2015). In order to combat IUU fishing, policy and legislation have been accessed to allow for enhanced cooperation between states, particularly in regions in which common fisheries policies are already applied (Papaioannou, 2016). In 2014 a new Common Fisheries Policy became effective aiming at managing European fishing fleets and conserving fish stocks including fisheries management, international policy, marketing and trade, and funding (EU, 2014). Since its entry into force more than 90 third countries have adhered to the EU standards by adopting the necessary legal instruments, procedures, and appropriate administrative structures for the certification of the catches by vessels flying their flag according to EU Regulation (EC, 2015). Through fisheries partnership agreements (FPAs) the EU gives financial and technical support in exchange for fishing rights, mainly with African states (EU, 2015).

Many factors have been considered to be responsible for the spread of IUU fishing but the increasingly bold behavior of IUU fishermen is always acknowledged to be associated with high profitability and subsidies (Kuperan and Sutinen, 1998). Funds invested in acquiring and equipping a fishing vessel can be recouped in just one fishing expedition and the IUU fishing stocks impacted most are high economic value species such as abalone and long-lived slow-growing species such as the Patagonian tooth fish (*Dissostichus eleginoides*) (Plagányi et al., 2011). Significant capital investment in marine fisheries has resulted in rapid advances in technology and increases in the size of the world fishing fleet and this in turn has led to more fish being harvested in less time and by a greater number of vessels (Baird, 2006). Other financial factors include the low cost of escape by fishermen from legal enforcement of IUU fishing regulations and supervisory factors including a lack of human means to monitor fisheries, and governments often cannot afford to implement marine conservation properly (Balton, 2008; Ting, 2013). More effort needs to focus on conservation to effectively sanction offenders and charge higher amounts per offense even if low numbers of offenders are caught (Dombouya et al., 2017). Moreover, in individual transferable quota (ITQ) systems, governments rely on the industry to report their catches when they reach quota, so that if a government struggles with IUU fishing it is highly unlikely that the industry will comply with quotas (Rebolledo and Hugo, 2014). In addition, ITQs strongly infringe upon the social and traditional dynamics of fisheries in small-scale communities which suffer from the impacts of illegal fishing (Soliman, 2015).

The total length of the Chinese coastline, including the coasts of offshore islands, is more than 32 thousand kilometers and this represents the fourth longest national coastline in the world. According to international marine law, the marine land surface region covers about 3.0 billion square kilometers and contains inland waters, territorial waters, exclusive economic zones and continental shelves. The total freshwater area covers about  $1.76 \times 10^5 \text{ km}^2$  with a total of 3 862 species of fish, and marine and freshwater habitats account for 20.3% of the total fish worldwide (Tang and Liu, 2003). At least 92 of the freshwater species are endangered in addition to a sharp decrease in the main species caught by fishermen (Wang, 2000). About 14 million Chinese fisheries personnel earn their living by fishing, and about 12 million tons of sea fish are caught annually by about 430 000 fishing vessels (Liu, 2017). The irrational pursuit of large fish catches has led to a sharp decline and some extinctions in economic fish resources (Zhang and Yan, 2007) and IUU fishing, especially electric fishing, has

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