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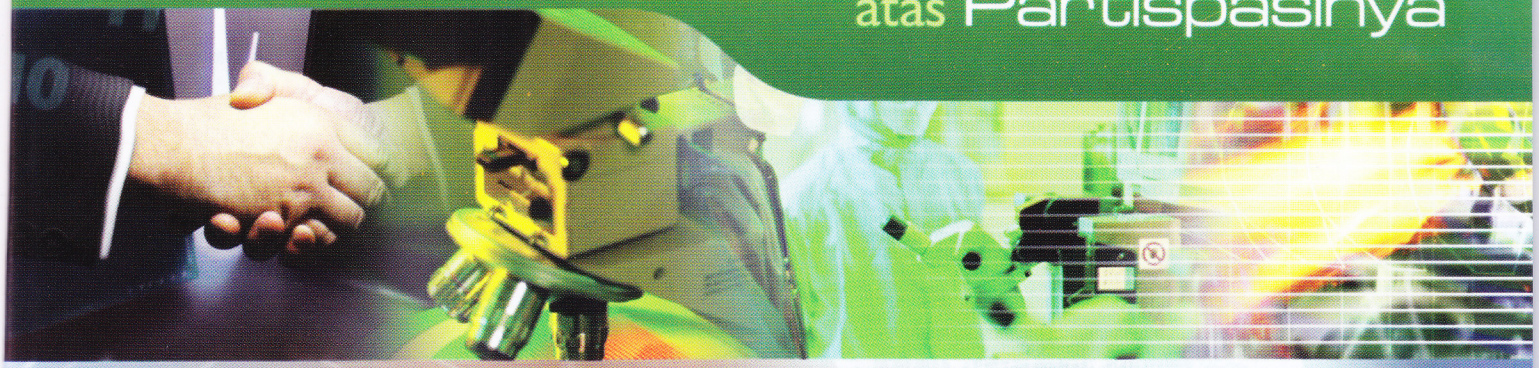

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ISI BUKU

I. KELOMPOK PENELITIAN TEKNOLOGI

II. KELOMPOK PENELITIAN LIFE SCIENCES

III. SOSIAL EKONOMI BUDAYA

ADAPTATION STRATEGY TOWARDS CLIMATE CHANGE FOR THE VULNERABLE FISHERIES OF INDONESIA

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Introduction

Indonesia covers a vast archipelagic area consisting of more than 17,000 islands stretching about 5,000 km from East to West and about 2,000 km from North to South with a coastline of 80,000 km. The total area of Indonesia is about 1,919,317 sq. km with a total population of about 210 Million in 2009 with a growth rate is 2.34% per annum (BPS, 2009). The situation of vulnerable fisheries resource somehow made fishers and other related parties uncomfortable. As of now, many parties have not prepared for the climate change. From many of landing places in Java reported for changes in: fish production, season time, sea-tides and others indicators of climate change.Therafter to outline the grass-root strategy on adaptation for the climate change in fisheries sector is necessary. The past 25 years since 1980 to 2008, a significant impact of climate change in terms of ecological or oceanographical variables had been detected (such as the Sea Surface Temperature (SST) positive anomaly, the seasonal extreme changes of ocean wind , wave height, etc). These phenomena will change on nutrient cycles, microbial, planktonic and larval community, fish behaviour such as spawning cycles, and ultimately to the marine fish production.

Materials and Methods

The objectives of the study are: (1) to identify the climate change in the fisheries sector; (2) to analyse the vulnerability of the fisheries sector; (3) to formulate a strategy on adaptation for the fisheries sector due to climate change. The main data used in the study are marine meteorology indicators such as wind speed and direction, sea surface temperature (SST) for 30 years, 1971–2000 which were collected from National Center for Environmental Prediction (NCEP). Interview with fishers in the study area were also carried out with suitable sample frame. Discussion with key-persons and other competence persons were also done accordingly. The study employed a GIS in marine meteorology (Hartoko and W. Sulistya, 2009) and socio-ecnomics approaches (Susilowati et al., 2004, 2005; 2009) with necessary modification.

The study area are located along the North coast of Java sea with 22 stations. The phenomena of climate change and vulnerability of the fisheries resource are estimated. The world geodetic system (WGS84) for geodetic datum and Geodetic for map projection was used in the digital mapping process. The necessary indicators of GIS in marine meteorology which may affected by the climate change then will be socialized to the competence persons for adaptation using empowerment strategy employed by Susilowati et al. (2004; 2005; 2009).

Results and Discussion

The sea surface temperature (SST) plays an important role since it indicates the interface from the atmospheric to the oceanographic environment. In general there were two peak and two crest for SST in a year periode. There were two cycles of low (February and August) and high (May and November) SST in avearage for 30 years (1971 -2000). The most important analysis on SST variability has been done that is the yearly SST variability for 30 years based (1971 to 2000). Before 1980, the anomaly of SST was in below normal, or cooler than its average value. But after 1980 the SST anomaly is above normal. This means that the SST of the Java sea was tends to increase after 1980. The global ocean phenomena may incurred due to global warming effect. The fisheries stock in Java sea is found to be declining (Squires et al., 2003; Susilowati et al., 2004b).

This was due to a heavy fishing efforts have been put on by fishers, especially with multi-gears. The impact on vulnerable fisheries in fish stock and environment quality toward the economic gain of micro-and small-fish processors in the study area (Pekalongan, Central Java) was significant. In general the economic gained by fishers in the study area were marginalising and tend to be dissipated particularly due to a fragile of the stock supplied to sustain the food security. Mostly fishers in the study area were powerless (Susilowati et al., 2004a; 2005) and the other hand, the behavior of fisheries resource has changed vulnerably inline with the global change. Therefore, it is indeed need to provide a sufficient prescription to a wake the micro- and small-scale of fishers in adjusting their behavior and habits towards the vulnerable changes in fisheries resource (Susilowati et al., 2008; 2009).

The key indicators of marine meteorology and geophysics (among others are seasonal pattern and climate zonation, wind variability, variability of sea surface temperature, sea water spatial distribution, etc) need to be disseminated to the fishers and the competent parties as a public information. Thereafter, fishers will be well informed about the current of vulnerability of fisheries resource. Moreover, the fast action on the campaign program (by all means), training or simulation, extensions program, etc are necessary needed to be designed and faster launching accordingly by the competent and relevant stakeholders.

Conclusion

Small-scale fisheries sector in Indonesia which is mostly composed by fisher with 5–30 GT engine fleets are the mainly party who affected by the vulnerable fisheries phenomena. At the moment, mostly small-scale of fishers (hunter, processor, traders, etc) are powerless. They likely have not aware and neither well-informed about the performance nor indicators of vulnerable fisheries. Therefore, empowerment action to the competent stakeholders (academician/ NGO; business, Government; Community) need to be launched simultaneously and integratedly with consideration on climate change and its biodiversity. With a help of the Department of Fisheries, a Board of Meteorology and Geophisics; Office of Community Empowerment; Department of Agriculture; Department of Industrial and Trade; and the Local Government in the respected regions, thus the powerment action could be designed and subsequently launched properly. Lastly, co-managment approach seems will provide a good promise.

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