

## **Foundation:**

# **Local People's Perceptions towards Arthropod Diversity Conservation in East Java**

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**Abstract:** Social surveys on local people have been conducted to observe the local people's perception towards Arthropod diversity conservation in several farming areas in East Java. Surveys were conducted in 2010 and 2011 in Madiun, Jember, and two locations in Malang. The first two study sites are locations of konjac farms, while the second location is two apple farms. In each study site, 20 respondents were selected by snow ball method. Data were collected by using a questionnaire survey and group discussion. In Madiun and Jember, local farmers were asked about perception on the role of soil Arthropods and its conservation. Furthermore, in two locations in Malang local farmers were asked about their perception on the role of canopy Arthropods and its conservation. Validity and reliability of questionnaire was tested prior to surveys. Data were analyzed descriptively using Likert scale. Result showed that in most local people knowledge and perception were low. In Madiun, the level of local people's knowledge was 20% (low), 65% (neutral) and 15% (high). Those in Jember was 2.5% (very low), 15% (low), 67.5% (neutral), 7.5% (high) and 7.5% (very high). In two study sites in Malang, local people's perception on the role of canopy Arthropods and its conservation was in the low category. In Malang 1, the level of local people's knowledge was 5% (very low), 75% (low), 10% (high) and 10% (very high). That in Malang 2 was 5% (very low), 70% (low), 15% (high) and 10% (very high). Although most respondents had limited knowledge about Arthropods, they had a positive attitude towards the role of Arthropod. This survey revealed that low level of local people's behaviour to conserve Arthropod was associated with level of education and practice of intensive farming systems.

**Keywords:** *Apple farm, Canopy Arthropod, Konjac farms, Local people's perception, and Soil Arthropod*

## **1. Introduction**

Habitat destruction and fragmentation, introduced species and afforestation are major problems in tropical region. These problems seem to have serious impact on Arthropod communities and diversity (Chey *et al.* 1998, Floren and Linsenmair 2003). East Java is located in equatorial tropics where examples of rapid destruction of forest occurred even in mountainous areas (Abdulhadi *et al.* 1998, Leksono *et al.* 2005; 2008). This situation is frequently associated with intensive agricultural practices (Leksono *et al.* 2005).

A new strategy to solve forest and habitat destruction problems is to develop community conservation (Infield and Namara 2001). This approach seeks to accommodate local people's needs and aspirations by empowering them, promoting their active participation in local resource management, and improving their economic welfare (Infield and Namara 2001, Mehta and Heinen 2001). In Indonesia, there are several government programs particularly in association with development of local people (Dephutbun 2010). Based on this scheme, local people are involved in the

management of agroforestry system based on konjac cultivation. There is evidence that cultivation of konjac helps prevent illegal logging and the occurrence of forest fire (Santoso *et al.* 2003).

The other factor that affected Arthropod communities was intensive agricultural practices. Several situations associated with modern agriculture make farms poor habitat for a number of pollinators, and many agricultural practices impact directly or indirectly pollinator populations (Kremen *et al.* 2002). Honey bees are among groups that are susceptible to intensification of apple farming such as application of pesticides.

Several studies have shown that many agricultural crops and natural plant populations are dependent on the services provided by wild, unmanaged pollinator communities (Kluser and Peduzzi 2007). However, study of local people's perception on pollinators in cultivation of trees especially in apple crop is few (*e.g.* Hong *et al.* 1989, Raj *et al.* 2012).

Many factors influence the perceptions of the local people towards conservation program. These include the degree of awareness of protected areas existence, the level of education and geographical origin (McClanahan *et al.* 2005, Vodouhê *et al.* 2010), the reference to future generation (Bauer 2003) and the gender and ethnicity (Mehta and Heinen

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2001). The understanding of all these factors is important to improve the relationship between local residents and protected areas and will improve people awareness about biodiversity conservation within these areas.

Konjac's powder is important agricultural product to supply East Asia market demand, while apple is the major fruit of the Malang accounting for more than 50% of total fruit production in this area. However, during the last four years, the production of apple per trees has decreased in spite of increased effort in apple cultivation. Recently, efforts for changed strategies to look for other possible practices in agricultural systems for increasing crop production in East Java have become concerted, and data of local people's perceptions are substantial for management plan. This survey was conducted to observe the local people's perception toward Arthropod diversity conservation in several farming areas in East Java.

## 2. Methods

Surveys were conducted in 2010 and 2011 in Madiun and Jember, while in two locations in Malang. First site located in Madiun, a hilly land in East Java ( $7^{\circ}43'S$ ,  $111^{\circ}37'E$ , 350 m in altitude). The area is an agroforestry system based on *Enterolobium* sp. plant as canopy tree and konjac cultivation (*Amorphophalus muelleri*) in forest floor. Second site located in Jember ( $8^{\circ}06'S$ ;  $113^{\circ}90'E$ , 400 m in altitude). The area is cultivated standing trees of *Paraserientes falcataria* combine with konjac cultivation in understory. The third and fourth sites are located in Malang 1 and Malang 2. These two locations in Malang were situated in adjacent villages. The areas are apple crop as canopy trees.

In each study site, 20 respondents were selected by snow ball method. In Madiun and Jember, local farmers were asked about their perception on the role of soil Arthropods and its conservation. In two locations in Malang local farmers were asked about their perception on the role of canopy Arthropods and its conservation. Validity and reliability of questionnaire was tested prior to surveys. Data were analyzed descriptively.

## 3. Results and Discussion

Knowledge of people in Madiun and Jember was considered neutral. In Madiun, the level of local people's knowledge was 20% (low), 65% (neutral) and 15% (high). Those in Jember were 2.5% (very low), 15% (low), 67.5% (neutral), 7.5% (high) and 7.5% (very high) (Fig. 1).

The local people in both locations were aware about the role of soil Arthropod in agroecosystem. In Madiun, the level of local people's attitude toward soil Arthropods conservation was 65% (high) and 35% (very high). That in Jember was 25% (low), 50% (neutral), 10% (high) and 15% (very high) (Fig. 2).

Results showed that level of behaviour of local people's to conserve soil Arthropods was low or neutral. In Madiun, the level of local people's behaviour was 85% (low) and 15% (neutral). That in Jember was 25% (low), 50% (neutral), 10% (high) and 15% (very high) (Fig. 3).

In two study sites in Malang, local people's perception on the role of canopy Arthropods and its conservation was in

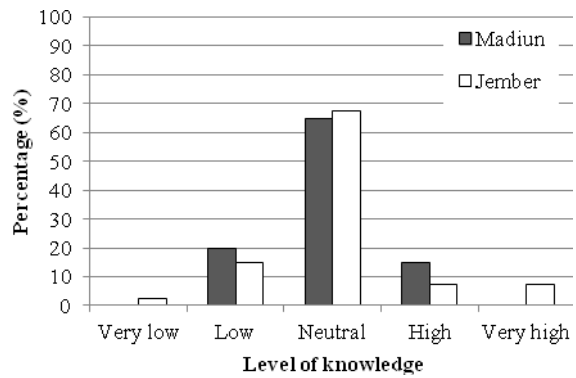


Fig. 1. Level of local people's knowledge on the role and diversity of soil Arthropods in Madiun and Jember.

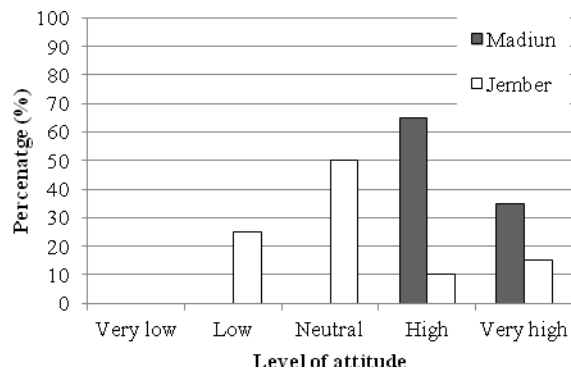


Fig. 2. Level of local people's attitude on the role and diversity of soil Arthropods in Madiun and Jember.

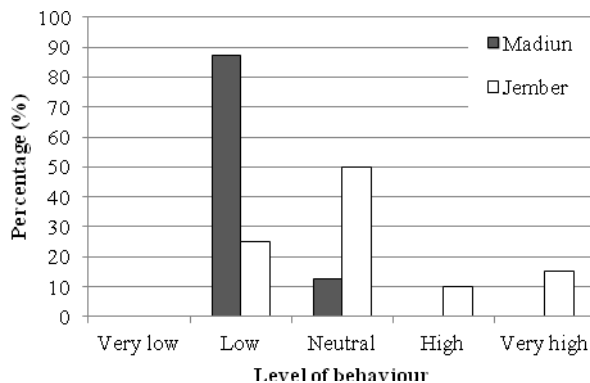


Fig. 3. Level of local people's behaviour on the conservation of soil Arthropods in Madiun and Jember.

the low category. In Malang 1, the level of local people knowledge was 5% (very low), 75% (low), 10% (high) and 10% (very high). That in Malang 2 was 5% (very low), 70% (low), 15% (high) and 10% (very high) (Fig. 4).

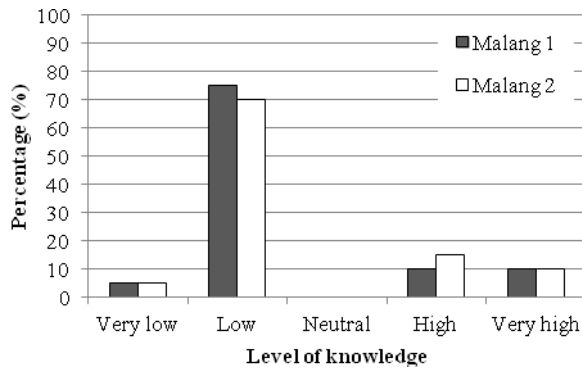


Fig. 4. Level of local people's knowledge on the role and diversity of soil Arthropods in Malang 1 and Malang 2.

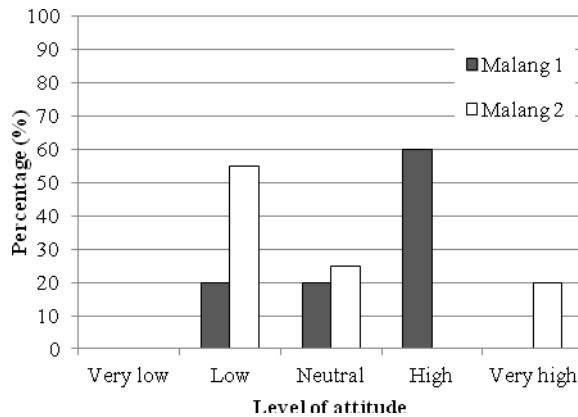


Fig. 5. Level of local people's attitude on the role and diversity of soil Arthropods in Malang 1 and Malang 2.

The local people in both locations were aware about the role of soil Arthropod in agroecosystem. In Malang 1, the level of local people's attitude was 20% (low), 20% (neutral) and 60% (high). That in Malang 2 was 55% (low), 25% (neutral) and 20% (high) (Fig. 5).

The level of behaviour of local people to conserve soil Arthropods in both study sites in Malang was low or neutral. In Malang 1, the level of local people's behaviour was 80% (low) and 20% (neutral). That in Malang 2 was 75% (low), 15% (neutral), 5% (high) and 5% (very high) (Fig. 6). Several situations were associated with the local people's perception towards environmental conservation education, gender, residence location, household size and acreage of land owned (Xu *et al.* 2006).

In our study the substantial factor was the education. It is very important in shaping the local people's knowledge and perception. Our study showed that the level of education of the local people affected their knowledge on the role and

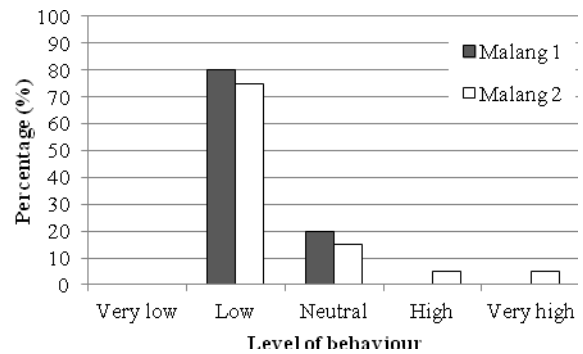


Fig. 6. Level of local people's behaviour on the conservation of soil Arthropods in Malang 1 and Malang 2.

diversity of Arthropods. Most farmers had low formal education level. Forty percent (40%) of those in Madiun had graduated from elementary school, while those of Jember were 45%. Similar situation was found in Malang. In Malang 1, 55% local people had graduated from elementary school, while in Malang 2, 60% had passed through elementary school. The level of education has increased participation of local community to conserve environment (McClanahan *et al.* 2005, Vodouhê *et al.* 2010). Awareness of local people on the role and diversity of Arthropods in Jember was better than those in Madiun. Local people in Malang were aware about the role of several canopy Arthropods such as bees and flies as pollinators. Similar to the knowledge, awareness also associated with perception and knowledge.

In all study sites, our interview and observations showed that local people did not act to conserve the Arthropods. In contrast to their attitude on the role and diversity of Arthropods, local people practiced more intensive agricultural practices that frequently harm the canopy Arthropods, by such practices as the use of several herbicides and insecticides.

Based on this situation, our study suggested several recommendations to local people in Madiun and Jember. First, effort to raise local people's knowledge and understanding should be initiated by government and scholars through intensive community service and field school on integrated pest management. Secondly, local people have to manage their land with the use of more environmentally friendly herbicides or insecticides such as using botanical substance. Third, local people should be concerned about the effect of intensive agricultural system on the non target organisms.

#### 4. Conclusion

Local people's knowledge, attitude and behaviour towards Arthropod diversity conservation in several farming areas in East Java were low. In all study sites, this study observed that practice of intensive agricultural system was high. The level of education affected the knowledge, attitude and behaviour of local people, therefore it is crucial to raise the local

people's knowledge by intensive community service and field school on integrated pest management.

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