The 6th ISTAP
International Seminar
on Tropical Animal Production

Integrated Approach in Developing Sustainable Tropical Animal Production

PROCEEDINGS

PART I

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Yogyakarta Indonesia

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PREFACE

On behalf of Faculty of Animal Science, Universitas Gadjah Mada, I am pleased to present you the 6th International Seminar on Tropical Animal Production (ISTAP) which is held on October 20 – 22, 2015 at Auditorium drh. Soepardjo, Faculty of Animal Science UGM, Yogyakarta. Under the main theme “Integrated Approach in Developing Sustainable Tropical Animal Production”, we expect that information and ideas on animal production systems in the tropics and its related problems will be shared among participants, thus we can elaborate an integrated approach in developing sustainable tropical animal production. I believe, this can be achieved since more than 250 animal scientists, researchers, students, and producers from more than 15 countries join this seminar.

In this moment, I have to address my great thanks to all people who have contributed for the success of this seminar. First, to all participants, thank you for your contributions, time, and efforts in participating in all sessions in this seminar. We also would like to extend our gratitude to the reviewers and editors for dedicate their expertise and precious time in reviewing and editing the papers. I deeply appreciate the hard work of all members of the Steering Committee, Organizing Committee, and students of Faculty of Animal Science UGM for making this seminar achieved a great success!

I hope all of you enjoy the seminar and Jogja as well!

Dr. Cuk Tri Noviandi

Editor in Chief
REPORT FROM ORGANIZING COMMITTEE

Dear all of the scientists, delegates, participants, ladies and gentlemen,

Praise be to The Almighty for His Merciful and Beneficent to raise up this memorable moment for all of the scientists and delegates from all over the world who were interested in Animal Science field to meet up together.

On behalf of all the members of Board Committee, it is my great pleasure and honor to welcome all of you and impress thankful, and present a high appreciation for your participation in joining the 6th ISTAP in Yogyakarta, one of the Special Region in Indonesia where culture and tradition live in harmony with the modern nuance and educational spirit makes it a beautiful venue of this seminar.

During this event, we have distinguished scientists from all over the world to present plenary papers Livestock Management, Production, and Environment; Feed, Land, and Landscape for Sustainable Animal Production; Livestock Industry and Technology; Economics, Social, and Culture in Livestock Development; and Special issue on Halal Food, Safety and Regulation. It is noted that around 200 scientists as well as livestock producers, companies, graduate and postgraduate students from 15 countries attend the seminar; and more than 160 research papers will be presented. We can see great enthusiasm of all the scientists to solve livestock problems as well as to share valuable information and knowledge for human prosperity all over the world.

The 6th ISTAP Program consists of scientific and technical programs as well as social and cultural activities. The scientific and technical programs offer 4 plenary sessions, field trip, and many scientific sessions (both oral and poster presentation). The social and cultural programs of the 6th ISTAP are very important as the scientific and technical programs since the promotion of friendship and future scientific cooperation are also central to this seminar. Opening Ceremony offers you the Seminar Program a glance. Participants will attend a warm invitation from Dean Faculty of Animal Science UGM in a Welcome Dinner that will give you the most memorable moment to attend. Field trip activity offers a wonderful sightseeing to the most spectacular natural landmark in Yogyakarta, Merapi Lava Tour and Ulen Sentalu Museum. We do hope that you will not miss any of these wonderful opportunities.

Closing Ceremony will be held on October 22nd, 2015, immediately after the last session of presentation. The 6th ISTAP award will be announced for some participant as an appreciation for their valuable research.

Finally, on behalf of 6th ISTAP Committee, I wish all of the participants having a great achievement of success and fulfill the expectation as well as enjoying the interaction with all scientists participating in the seminar.

High appreciation I may acknowledge to the Rector of Universitas Gadjah Mada and Dean Faculty of Animal Science UGM, who have concerned to facilitate the seminar site host.

Special thank to the Steering Committee, Scientific Committee, Reviewers and Editorial Boards for their great contribution to make the seminar successfully organized.

Terima kasih (Thank you).
Sincerely Yours,

Prof. I Gede Suparta Budisatria, Ph.D
Chairman
The Organizing Committee of the 6th ISTAP
WELCOME ADDRESS

Selamat pagi (Good morning)

Dear Rector of Universitas Gadjah Mada, all of Invited Speakers, honorable guests, all of delegates, participants, distinguished guests, Ladies and Gentlemen

Attendants of The 6th ISTAP,

It is my great pleasure and honor to extend a warm welcome to all of you at The 6th International Seminar on Tropical Animal Production, which be held on October 20 – 22, 2015 at Auditorium drh. Soepardjo, Universitas Gadjah Mada, Yogyakarta Indonesia. This seminar is proudly organized by Faculty of Animal Science Universitas Gadjah Mada.

The contribution of this seminar to the development of national food security is truly significant for introducing of new scientific knowledge and equipments that is much needed in Indonesia to maintain a safe and secure environment and to look at more effective ways to meet future challenges. We can see great enthusiasm of the entire participant to present their latest research as well as to share valuable information and knowledge for human prosperity all over the world.

In these 3 days of seminar, we have invited some Plenary Speakers and Invited Papers who are qualified as scientists and bureaucrats in animal science field to share their valuable information and knowledge. Other participants can deliver their precious research through oral and poster presentations.

Finally, on behalf of Faculty of Animal Science, we would like to extend our sincere gratitude to the Minister of Rural, Rural Development, and Transmigration, Republic of Indonesia, Mr. Marwan Jafar, for his generosity to be with us here to give Keynote Speech. Then, it is our great honor and pleasure to have qualified scientists and bureaucrats as Plenary Speakers and Invited Papers to share their valuable knowledge during the plenary and concurrent sessions. Moreover, special thank you is for the Steering Committee, Scientific Committee, Reviewers and Editorial Boards for their great contribution to make the seminar a great success. Also, we would like to congratulate and deliver high appreciation to the Organizing Committee as the organizer for their great contribution and generous efforts to make the seminar successfully organized.

And to all of the participants, I hope that this seminar will always success and bring some acknowledgement for all of us. Also, I wish all of the participants having a great achievement of success and fulfill the expectation as well as enjoying the interaction with all participants.

With all of our hospitality, we will try our best to make your brief visit to our country become a wonderful and memorable moments.
We are looking forward to meeting you all in the future event.

Wish you all a very pleasant and most enjoyable stay in Yogyakarta, Indonesia, beside you scientific journeys.

Terima kasih (Thank you).

Sincerely Yours,
Prof. Dr. Ali Agus
Dean Faculty of Animal Science UGM
OPENING REMARKS

Dear all of Scientists, distinguished guests, delegates, participants, Ladies and Gentlemen,

On behalf of Universitas Gadjah Mada, I am happy to welcome you and present a high appreciation for your participation in joining the 6th International Seminar on Tropical Animal Production hosted by the Faculty of Animal Science UGM in Yogyakarta from 20 – 22 October 2015.

Under the theme of “Integrated Approaches in Developing Sustainable Tropical Animal Production”, we do hope that this seminar concludes with shared ideas and best practices, technology, and global networks that are required to increase animal production. The increase of animal production as one source of food is crucial to feed the world given that the population is expected to increase from 6 billion to about 8.3 billion in 2030. According to FAO (2008, 2009), the consumption of animal food increased from 10 kg/per annum in 1960, 26 kg/per annum in 200, and it is expected to be 37 kg/per annum. Animal production is an integral part of food production and contributing for the quality of human food supply. Animal and agricultural production is an important component in the integrated farming systems in developing countries as this produces high quality foods, provides job opportunities in rural areas, as well as enriching livelihood.

As a tropical country with high animal biodiversity, Indonesia and other tropical countries, have a variety number of indigenous and local animal genetic resources and germ plasm. This variety of animal germ plasm could be explored and developed not only for animal and food production but also for animal conservation. Apart from being exploited as food resources, it is therefore important to consider animal conservation. Conservation will protect the genetic potency of local bred and their family, and the domesticated animal bred, and this would secure our future food resources.

In these 3 days of seminar, we believe those aforementioned issues will be discussed, and technical solution as well as recommendation will be provided to solve the existing problems in tropical animal production.

Finally, on behalf of Universitas Gadjah Mada, we would like to congratulate and thanks to the Faculty of Animal Science UGM as the organizer for their great efforts to make the seminar successfully organized. To all of participants, I wish all of you have a great discussion and interaction with other scientists participating in the seminar as well as enjoying your time in Yogyakarta.

Thank you

Prof. Ir. Dwikorita Karnawati, M.Sc., Ph.D.
Rector of Universitas Gadjah Mada
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ABSTRACT: Implementation of Rural Industries Research and Development Corporation (IRDC) through integrated farming with bio-cycle farming or integrated biosystem is very useful to increase the Total Economic Value. The objectives of the research was identify and measure the intangible value benefit and cost, calculate the Total Economic Value (TEV), and analyze the sensitivity of the farm business with the assumption that the change in maintenance management, pricing, and environmental changes. Sampling was carried out on cattle farmers who are members of the village group system and individual system in Sleman Regency which implement business diversification cattle and crops and organic vegetable and waste management into organic fertilizer. Measurement of intangible benefits and costs, Total Economic Value and sensitivity were analyzed descriptively in table form. The results showed that the highest value of the intangible benefits derived from the use of manure that adds value to land productivity 6,196,500 IDR/ head/year or 4,312,620 IDR/ AU/ year. Value of intangible costs are Willingness To Accept (WTA) of 3,320,000 IDR/ head/ year, or 2,199,500 IDR/ AU/ year higher than Willingness To Pay (WTP) of 456,765 IDR/ head/year or 302,605 IDR/ AU/ year. The Total Economic Value of the assets showed that resource in village group system 237,548,645 IDR/ head/year or 157,375,978 IDR/ AU/ year. An increasing number of cows population and improvement of the environment by offering individual system farmers willingness to relocate to the village group provides the highest TEV so that it can be concluded that the need for linkages between economic and environmental factors to increase the Total Economic Value.

Keywords: intangible benefit, intangible cost, integrated biosystem, Total Economic Value

INTRODUCTION

Every economic activity should make the process of “internalizing external costs” which takes into account the environmental cost or value of the losses suffered by the other party as one of the main components of production costs (Pearce et al., 1990). Measurement appreciation of the environment is needed to determine the intangible cost is how much willingness to pay for external costs or willingness to pay (WTP) and a willingness to accept compensation or Willingness To Accept (WTA) in cattle (Cao et al., 2010, Carson et al., 2000). On the other hand in the assessment of environmental economics-cattle farming need to include intangible benefits or indirect use value which is a function of livestock as savings and insurance as well as the value of land productivity of livestock manure utilization. This is expected to increase the total economic value of added value environmental resources. The total economic value (TEV) is applied here as framework used to categorise ecosystem values (Hugues, 2011, Fagnola et al., 2004).

MATERIAL AND METHOD

Sleman regency election as a test site for the reason that in this area of beef cattle that could potentially be developed and had many cattle village group (Anonymous, 2003). The material in this study are farmer Sembada samples belonging to the enclosure of village groups and individual systems. Sampling was done by census farmers are taking all the respondents were joined as
members of as many as 24 farmers. Which shows the Total Economic Value of the asset value of livestock resources formulated: \( \text{Net benefit} = (\Delta B - \Delta C) / \text{head orAU/year} \) (after the discount factor is discounted at an interest rate of agricultural loans \( \times \) number of cattle (head or AU). Sensitivity analysis related to the possibility of a change in maintenance management, the addition of the cow population, output price, environmental changes then made a simulation and TEV ordered by highest value. What percent decline in CI values, the increase in selling prices, great willingness to accept compensation for relocating farmers individual system to village group is determined through interviews with farmers.

RESULTS AND DISCUSSION

Application of Integrated Bio Cycle Farming in the village group produces security measures against the resilience and availability of food and energy, namely: (1) F1 (food), namely the members of the group seeking human food in the form of plant food (rice plants, crops and vegetables) and cattle meat, (2) F2 (feed), from the cultivation of rice and pulses waste can be utilized for making fermented feed, (3) F3 (fertilizer), cattle feces to produce organic compost with a variety of nutrient content. Bio or organic fertilizer not only as fertilizer but also as a nurse ground (soil conditioner), which from an economic standpoint as well as the character of their products are not inferior to artificial fertilizers.

![Integrated Biosystems cycle in cattle farmer-group Sembada](image)

**Table 1. Intangible Benefit and Cost Group Livestock Farmer-Sembada**

<table>
<thead>
<tr>
<th>Component</th>
<th>(IDR/head/yr)</th>
<th>(IDR/AU/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intangible benefit</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Livestock as savings</td>
<td>138,450</td>
<td>91,725</td>
</tr>
<tr>
<td>Livestock as insurance</td>
<td>174,665</td>
<td>115,715</td>
</tr>
<tr>
<td>Land productivity</td>
<td>6,196,500</td>
<td>4,105,181</td>
</tr>
<tr>
<td><strong>Total Intangible benefit</strong></td>
<td><strong>6,509,615</strong></td>
<td><strong>4,312,620</strong></td>
</tr>
<tr>
<td><strong>Intangible cost</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time risk based on mileage</td>
<td>100,800</td>
<td>66,780</td>
</tr>
<tr>
<td>The risk of labor</td>
<td>118,190</td>
<td>78,300</td>
</tr>
<tr>
<td><strong>Willingness To Pay (WTP)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve livestock barn</td>
<td>180,190</td>
<td>119,375</td>
</tr>
</tbody>
</table>
Assuming the bank rate at 7.5% and 8% interest rate insurance and dirt weight of approximately 7.5 kg/head/day, the total value of intangible benefits gained 6,509,615 IDR/head/year, or 4,312,620 IDR/AU/year. Khan et al. (2013) and Dilek et al. (2010), the most of the farmers were willing to participate in cattle insurance. Willingness To Accept (WTA) is higher than the Willingness To Pay (WTP). This is due to the compensation/damages that farmers want to switch to village group are higher than the value of WTP farmer in village group. Farmers are still reluctant to switch to village group because most groups have non-farm jobs that require a lot of work time so chose raising cattle in the house for ease in maintenance. This indicates an appreciation of the environment of the individual system is still low. They hope that if the relocation to the village group then there are groups maintain their livestock or paid for cattle raising the opportunity cost to replace their non-farm activities. The Total Economic Value of 237,548,645 IDR/year for the head or 157,375,978 IDR/year for the Animal Unit (AU). This shows the great value of resource assets in village Sembada group of beef cattle in the hamlet village Sanggrahan, Condongcatur each year.

The simulation results showed that the increase in the number of cow population is very influential on the increase in value of the total economy if farmers can increase business scale then an increase in productivity of livestock. On the other hand despite the appreciation of the individual system is still low, but if they get the socialization of the importance of raising cattle in a certain area of the environment for the sake of convenience, there will be an increase in the total economic value of the area due to the presence of enclosure group of beef cattle, so it can be concluded that the need for linkages between economic and environmental factors to increase the Total Economic Value.

### Table 2. Priority Order Feasibility TEV in Village Group System for Next 5 Years

<table>
<thead>
<tr>
<th>kind</th>
<th>TEV (IDR/yr)</th>
<th>note</th>
<th>Rank order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal conditions</td>
<td>79,188,901</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>CI decline and the weaning period</td>
<td>91,569,283</td>
<td>Increased TEV 15.64%</td>
<td>4</td>
</tr>
<tr>
<td>An increase in the selling price of calves</td>
<td>98,191,866</td>
<td>Increased TEV 24.00%</td>
<td>3</td>
</tr>
<tr>
<td>Increased cow population</td>
<td>152,286,349</td>
<td>Increased TEV 92.00%</td>
<td>1</td>
</tr>
<tr>
<td>Environmental changes</td>
<td>128,276,861</td>
<td>Increased TEV 61.99%</td>
<td>2</td>
</tr>
</tbody>
</table>
CONCLUSIONS

Strengthening cooperation is necessary capital to increase the cattle population in the village group and socialization of the Department of farms and educational institutions to farmers about the importance of maintaining cows in a specific area for improvement and environmental comfort. In addition, more research is needed on the measurement of the content of organic compost to increase soil fertility at the same time increase the productivity of land.

REFERENCES


CERTIFICATE

This is to certify that

RINI WIDIATI

has participated as ORAL PRESENTER at the 6th International Seminar on Tropical Animal Production "Integrated Approach in Developing Sustainable Tropical Animal Production" Faculty of Animal Science Universitas Gadjah Mada, Yogyakarta-Indonesia October 20th - 22nd, 2015

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