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	Kapan saja Sejak 2021 Sejak 2020 Sejak 2017 Rentang khusus Urutkan menurut relevansi	Community Based Indigenous People's Human Settlement Preservation in Indonesia: A Conceptual Framework <u>A Manaf, I Wahyudi</u> , AA Puspita Advanced Science, 2018 - ingentaconnect.com Recently, community-based approaches are widely applied in development activities especially in developing countries. Indonesia is no exception, there are efforts to take advantage of this approach in addressing issues related to the conservation of indigenous human settlements. To apply it in Indonesia with more than 1128 ethnic groups, of course this is not simple, each region has its own uniqueness, so this approach needs to be	[PDF] ingentaconnect.com
	Urutkan menurut tanggal	developed to better fit the context in which it will be applied. This article attempts to present a ☆ 99 Artikel terkait Menampilkan hasil terbaik untuk penelusuran ini. Lihat semua hasil	



# A SPECIAL SECTION



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# Selected Peer-Reviewed Articles from the International Conference of Vocational Studies on Applied Research (ICoVAR) 2017, Indonesia, 13–15 September, 2017

We are pleased to introduce the proceeding of International Conference of Vocational Studies on Applied Research (ICoVAR) 2017, which was held by Vocational School, Diponegoro University, Indonesia on 13th–15th September 2017. The conference was attended by more than 200 participants with approximately 120 papers have been submitted from various countries such as Indonesia, United Kingdom, Russia, Pakistan and Switzerland.

ICoVAR 2017 presented issue of Vocational Studies and Applied Research, to promote technology innovation, and to make feasible economic activities during implementation of applied technology. The event successfully accommodated the academics, researchers, students, industries, stakeholders and government in an international forum. The goal of ICoVAR 2017 is giving depth discussion, comprehensive sharing, and ideas exchange. All of these activities boosts the formation of networks among participants for improving next research quality.

Internationally reputable academics and practitioners contributed to the event as the Keynote Speakers and Scientific Committee:

1. Prof. Mohamad Nasir (Minister of Research, Technology and Higher Education, Indonesia)

2. Prof. Dr. Ir. Sigit Pranowo Hadiwardoyo, DEA (Head of Indonesian Forum of Vocational Higher Education, Indonesia)

3. Mr. Muliaman D. Hadad, Ph.D. (Financial Authority Agency, Indonesia)

4. Prof. Budiyono (Diponegoro University, Indonesia)

5. Prof. Takehiko Otsuka (Akashi National College of Technology, Japan)

6. Dr. Jagroop Pandhal (University of Sheffield, United Kingdom)

7. Dr. Rini Mulyani (Bung Hatta University, Indonesia)

8. Mr. Andrea Nicola Weiss (Practitioner of Nature Resource, Switzerland)

 Dr. Wikan Sakarinto (Gajah Mada University, Indonesia)
 Mr. Reinhard Flohr (Practitioner of Business Management, Germany).

ICoVAR 2017 was opened by Rector of Diponegoro University with attendance of a representative from Ministry of Research, Technology and Higher Education, Indonesia. The event was conducted by Keynote Speech sessions then followed by 5 plenary lectures covering areas of Civil and Planning, Business and Finance, Information and Culture, Vocational Studies and Industrial Engineering. The next event of ICoVAR 2018 will be held in Bangka Island, Indonesia. Considering that science is escalating rapidly, especially areas which is covered as the scope of this conference. We expect that the next ICoVAR 2018 will be as encouraging as the current one, which has been indicated by the articles presented in this proceedings volume.

Head of Organising Committee

Dr. Anggun Puspitarini Siswanto International Conference of Vocational Studies on Applied Research (ICoVAR) 2017 Vocational School, Diponegoro University Semarang, Indonesia

#### **Guest Editors**

Budiyono Diponegoro University, Indonesia Andrea Weiss Natural Practitioner, Switzerland Takehiko Otsuka National Institute of Technology, Akashi College, Japan

# A SPECIAL SECTION

### ABOUT THE HEAD OF ORGANISING COMMITTEE



**Anggun Puspitarini Siswanto** completed her Doctorate Degree from Department of Chemical and Biological Engineering, University of Sheffield, United Kingdom. She is currently working as a lecturer in Department of Chemical Engineering, Vocational School, Diponegoro University, Indonesia. She also serves as a Coordinator of Collaboration Affairs with main responsibility to establish prospective collaborations not only with local partners but also with international collaborators. She also has to maintain the existing collaborations within the Faculty as well as the University. Her research interest covers Plasma Technology Application, Biomass Utilisation and Water Treatment. She has involved in many international meetings and conferences. She also has published scientific articles in proceedings, journals as well as in some competitions.

### ABOUT THE GUEST EDITORS



**Budiyono** currently serves as the Dean of Vocational School at Diponegoro University, Indonesia, Prof. Budiyono is a well-known academic with an expertise on Renewable Energy. He has an experience for more than 25 years in teaching, supervising and research in the Department of Chemical Engineering, Diponegoro University. He is also actively engaged in community services as well as being Editor in Chief in reputable journals. He has published articles in many accredited journals both nationally and internationally.



Andrea Weiss is a keen practitioner from Switzerland who is focusing on natural resources conservation. He has been working closely with Indonesian communities across the country for many years. Some projects involve establishing research application on woods and forests in Borneo Island, educating societies for hands-on practices and conducting workshops in related research interest. He has joined numerous activities for in academic forums as well as in professional projects.



**Takehiko Otsuka** is associated with Department of Architecture in National Institute of Technology, Akashi College, Japan. His research interest is Universal Design which concerns in accessible facilities for those who have disabilities and low impairment. The study has been conducted not only in Japan but also in Indonesia with involvement of local wisdom. He has been invited as speakers in international conferences and workshops.

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Ida Hayu Dwimawanti and Ifwanda Mar'atuz Zakiyya



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# Plasma Reactor Characterization of Lignocellulosic Materials on Agricultural Waste Treatment

Anggun Puspitarini Siswanto<sup>1,\*</sup>, Dmitriy Kuvshinov<sup>2</sup>, Jagroop Pandhal<sup>3</sup>, and William Zimmerman<sup>3</sup>

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<sup>2</sup>School of Engineering and Computer Science, University of Hull, United Kingdom

<sup>3</sup>Department of Chemical and Biological Engineering, University of Sheffield, United Kingdom

Agricultural waste treatment has becoming an emerging issue for the society which is linearly increasing with number of population and food production. Agricultural waste can be considered as by product of agricultural activities. This includes manure, fertilizer, dry leaves and other waste from farms or animal slaughter houses. It mainly contains lignin compound which is known notoriously difficult to be degraded by nature. It requires expensive and long term of process to degrade lignin due to its natural characteristics. Plasma reactor has existed for over decade in which also known as a green technology as it produces no post production waste. This study aims to characterize plasma reactor by its ignition voltage and air flow rate as the operating condition. Ozone produced by the plasma reactor is further utilized for lignocellulosic materials sample. The study shows that plasma reactor operated in 0.5 l/minutes of air flow rate produced an ignition voltage at approximately 4 kV. This result is expected to be a promising technology to meet market demand on treatment of lignocellulosic materials. Therefore, it can be widely applied on agricultural waste management system.

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Keywords: Agricultural Waste, Green Technology, Lignocellulosic Materials, Plasma Reactor.

#### 1. INTRODUCTION

Agricultural waste is abundant in the nature, along with food residues and organic waste from industrial by product, result in environmental pollution which needs to be addressed. These materials are sources of lignocellulosic compound that contain lignin which is identified as the outer layer on cell structure of hemicelluloses and cellulose.<sup>1,2</sup> Hemicelluloses and cellulose are two main components which widely utilized for purposes due to its high sugary content.<sup>1,3</sup> Furthermore, these components are potential raw materials in many industries such as biofuel, food and chemical industries. In order to be able to do treatment on hemicelluloses and celluloses, induction on the lignin layer needs to be conducted. However, lignin is insusceptible to degradation both by treatment using enzyme and chemical approaches.<sup>4,5</sup> Researchers have done experiments which require expensive and long term treatment duration to get through lignin layer in the molecular structure of samples. Figure 1 shows the structure of lignin, hemicelluloses and celluloses.<sup>3</sup>

A novel approach has been conducted to investigate lignin degradation with environmental friendly methods. Ozone utilization is become preferable because it is considered as a practical approach with no specific requirement for the operating conditions.<sup>6</sup> Experiment was conducted in room temperature

and atmospheric pressure which can be further implemented for industrial application. Ozonolysis application for sawdust treatment was conducted which resulted in an application of plasma reactor operating voltage up to over 30 kV.<sup>7</sup> This operating voltage is seen not economical as higher voltage brings higher operating cost. Moreover, a modern ozone generator was then further applied for treatment of barley straw.<sup>8</sup>

Ozone can be produced by various methods such as electric barrier application, electrocatalysis and ultraviolet irradiation. Ozone is generated by passing through a gas in the high electricity region which resulted in split of oxygen molecules to be ozone molecules.<sup>9,10</sup> Figure 2 describes mechanism of ozone molecules generation.<sup>11</sup> Corona discharge and Dielectric Barrier Discharge Plasma reactor are commonly used for ozone generation.<sup>11,12</sup> In order to produce ozone, it is required to reach an ignition point where the plasma is first ignited during the reactor operation. It is also known as the ignition voltage in which seen as the parameter of reactor characterization to determine its performance. Once plasma is ignited, during the process, oxygen-rich gas is then converted to be ozone molecules. Ozone has been known as one of the strongest oxidant as compared in Table I.<sup>9</sup>

This research aims to characterize plasma reactor as the ozone generator which will be further used for treatment of lignocellulosic materials. Characterization is conducted prior to the lignin degradation treatment in order to investigate the reactor stability. Ignition voltage of plasma reactor has become the main interest

<sup>\*</sup>Author to whom correspondence should be addressed.



Fig. 1. Cell structure of lignin, hemicelluloses and cellulose.



Fig. 2. Mechanism of ozone molecules generation by air

Table I.	Oxidizing	potential	of	various	oxidants.
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Oxidants	Oxidizing potential (V)
Fluorine	3.06
Hydroxyl free radicals	2.80
Atomic oxygen	2.42
Ozone	2.07
Chlorine	1.36
Oxygen	1.23
Hypochlorite	0.94

which is expected to be baseline for industrial application for agricultural waste treatment.

#### 2. EXPERIMENTAL DETAILS

A Dielectric Barrier Discharge Plasma Reactor was used during the experiment in which detail set up was described by author.<sup>13</sup> Experiment was conducted by application of air as the gas passing through plasma reactor. Air flow rate was set to 0.5 L/minutes which is supplied to the flow connection network of the plasma reactor. The reactor is connected to a power supply of 500 W at a frequency of 50 kHz. Characterization was done with use of TES TEC HVP-15 HF High Voltage Probe which was controlled by a Computer System of Picoscope ADC-212 Oscilloscope. The reactor was connected to the high voltage probe while spectrum resulted by the program was then used for determining the ignition voltage.

#### 3. RESULTS AND DISCUSSION

Ozone generation during the experiment was indicated by the plasma ignition which was detected by the safety sensor both visually and experimentally. Plasma voltage stability check was conducted which showed in Figure 3. It is shown that the voltage of plasma reactor was increasingly stable during the experiment. Repeatability check also showed consistent result which indicting that the reactor performed well and plasma was generating



Fig. 3. Plasma reactor voltage stability check.



Fig. 4. Picoscope spectrum during plasma ignition stage.

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b consistently. A homogenous plasma discharge is expected to be resulted by this bespoke plasma reactor.

Figure 4 shows that the ignition voltage reached in the experiment is approximately at the level of 4 kV. Spectrum of Picoscope recorded a seamless signal curves which also showing the default voltage for Dielectric Barrier Discharge Plasma Reactor. Data was recorded in a scale of 2 milliseconds which continued in further experiments. Voltage stability was monitored during the research. This also applied in further experiment of lignocellulosic materials treatment by ozone application. Ozone which was produced by the reactor then become potentially used for future application such as for agricultural waste treatment.

#### 4. CONCLUSION

A stable plasma discharge was produced during the experiment in which a 4 kV of ignition voltage was applied during ozone generation. Consistent plasma discharge was achieved which shows a promising alternative approach for lignin degradation treatment. This also allows more economic and environmental friendly technology of plasma reactor to be implemented in the industrial management system, such as for treatment of agricultural waste.

**Acknowledgments:** Author acknowledges the Ministry of Research and Higher Education of Indonesia for the Scholarship during conducting this research.

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# RESEARCH ARTICLE



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# Effect of the Ni/Al<sub>2</sub>O<sub>3</sub> Catalyst Synthesis Conditions at Application of the Solution Combustion Preparation Method on the Catalyst's Properties and Efficiency in the Process of Nanofibrous Carbons Synthesis from Methane

D. G. Kuvshinov<sup>1,\*</sup>, P. B. Kurmashov<sup>2</sup>, A. G. Bannov<sup>2</sup>, A. P. Siswanto<sup>3</sup>, M. B. Popov<sup>4</sup>, and A. G. Cherkov<sup>5</sup>

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The urotropin based solution combustion method was investigated and optimised in this research. This is the cost effective, simple and productive method for catalytic materials synthesis with further application in the processes of hydrocarbon catalytic decomposition to hydrogen and useful nano structured carbons. Three procedures for catalytic systems synthesis were studied and the nano structure of the obtained catalytic materials were characterised. Efficiency in the hydrocarbon decomposition processes was evaluated in methane decomposition. It was found that crystallite size of formed NiO does depend on a temperature of a combustion front. Smaller averaged crystallite size resulted to higher yield of nano structured carbons. The highest activity in methane decomposition process with the formation of hydrogen and nanofibrous carbon was observed for the catalyst systems synthesised by the total dissolution (third) method.

Keywords: Catalysts, Solution Combustion, Urotropin, Catalytic Pyrolysis, Nonofibrous Carbon.

#### 1. INTRODUCTION

This research is done within the frame of catalytic processes development for nano fibrous carbons synthesis. The core reaction of the catalytic decomposition process is described as  $C_n H_m \rightarrow nC + (m/2)H_2$ . This reaction occurs in presence of nano dispersed oxides of group VIII metals (Fe, Ni) and their alloys. Morphology of carbon nano structures (CNS) obtained via catalytic decomposition of hydrocarbons does depend on the nature of the catalytic materials and the synthesis conditions (temperature, hydrocarbon source and pressure).<sup>1</sup> The powder type catalysts have the highest CNS yield. The widely accepted deactivation model for these catalytic systems is blockage of active centres by deposited carbons. The application of these systems resulted to CNS synthesised in form of granules made from entangled nano fibrous.<sup>2-5</sup> It was shown that granulated carbons could be applied as sorbents,<sup>6</sup> catalysts,<sup>7</sup> supporters for non organic,<sup>8</sup> bio-active components<sup>9</sup> and in production of colours,<sup>10</sup> electro conductive materials11 and nano carbides synthesis.12 The properties of obtained CNS significantly depend on the nature of applied catalytic systems.

Nowadays the solution combustion method is recognised as one of the perspective approaches for catalysts materials synthesis. This in particular is due to the one stage relatively simple procedure and high throughput. In this processes a metal salt is reduced to an oxide form via high temperature treatment. Initial mixtures of a metal salt with the selected promoter and organic compounds for example urotropin, carbamide or glycine, are gradually heated up in air. At certain temperature an organic components flamed up which resulted to the sharp peak of a mixture's temperature to the temperature of a metal salt reduction along the way of a flame front movement.

#### 2. EXPERIMENTAL DETAILS

In this study, Ni(NO<sub>3</sub>)<sub>2</sub> · 6H<sub>2</sub>O; Al(NO<sub>3</sub>)<sub>3</sub> · 9H<sub>2</sub>O and C<sub>6</sub>H<sub>12</sub>N<sub>4</sub> were used as obtained from the Sigma Aldrich. In this work the metal salts, promoters and urotropin were mixed it certain ratios by different methods followed by heating in air up to 450C

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at the heating rate of 1C/min to initial a solution combustion process. Investigation of the catalysts' efficiency in the process of hydrocarbons decompositions curried out with use of flow through quartz reactor in presence of methane at temperature of 550C and pressure of 1 Bar. The volume flow rate of methane was set to 100 L/hour per gram of catalyst. Catalysts was heated up to 550C in Ar atmosphere. After temperature stabilisation at 550C the flow of Ar, 1.2 L/hour per gram of catalyst, was switched to methane. Content of inlet and outlet gas flows was detected by GC, Chromos GX-1000, with use of Ar as the carrier gas. Temperature recording was done by low inertia thermocouple of TXA-type under control of Termodat 7.35S software. Phase content of oxidised samples was investigated by XRD with application of Cu K $\alpha$ -radiation ( $\lambda = 0,15406$  nm). Crystallites dimensions was calculated with use of Scherrer equation. Morphology of catalytic systems and formed NFC was investigated with use of electron microscopy, JEOL JEM-2200 FS-CS, resolution 0.1 nm.

In this research three methods of the catalytic system synthesis were investigated. First method. The crystalline Nickel (II) nitrate hexahydrate and Aluminium nitrate in proportion 13 to 1 were decomposed at 150C during 15 minutes under stirring conditions. A C<sub>6</sub>H<sub>12</sub>N<sub>4</sub> was added in a solid phase to the obtained solution in ratio 1 to 1 by mass. Due to stirring all the three components were uniformly mixed. A sample was heated in air up to 450C with the heating rate of 1C/min. After a flame initiation the catalytic systems were prepared by the self-propagating hightemperature synthesis (SHS) reaction. In the second method the crystalline Nickel (II) nitrate hexahydrate and Aluminium nitrate in proportion 13 to 1 were decomposed at 150C during 15 minutes under stirring conditions. A C<sub>6</sub>H<sub>12</sub>N<sub>4</sub> was added in a liquid phase to the obtained solution in ratio 1 to 1 by mass. Due to stirring all the three components were uniformly mixed. A sample was heated in air up to 450C with the heating rate of 1C/min to initiate a SHS. For the third method the crystalline Nickel (II) nitrate hexahydrate and Aluminium nitrate were mixed in proportion 13 to 1. A solid phase urotropin was added to the solid mixture in ratio 1 to 1 by mass. Obtained sample was dissolved in DIW at stirring conditions in ratio 1 to 20 (DIW) by mass. A sample was heated in air up to 450C with the heating rate of 1C/min. After a flame initiation the catalytic systems were prepared by SHS.

After completion of the solution combustion, the majority of the catalytically active nano particles in a catalyst are in the oxide form and therefore inactive in the process of hydrocarbons decomposition. Nevertheless some limited amount of reduced metal particle was formed during the solution combustion process due to metal oxide particles treatment by the ammonia generated in the solution combustion process. These reduced particles are active in the hydrocarbons decomposition accompanied by hydrogen generation. This chain-like process resulted to reduction of all the nano dispersed metal active phase from oxide state to metal state by hydrogen generated during methane decomposition.

#### 3. RESULTS AND DISCUSSION

In this research 9 samples were selected for more detailed investigation. The samples 1–6 were produced by the first method. The sample 7 was synthesised by the second and the samples 8 and 9



Fig. 1. Temperature profiles of the catalysts synthesis process.

by the third method. Recorded temperature profiles of the catalysts synthesis process are presented in the Figure 1. Observed pikes are result of the fast short termed SHS self-initiated at different temperatures. It was found that the SHS initiation temperature and its maximum temperature level does depend on the method applied for catalysts preparation. The samples 1-6 prepared by the first method have showed SHS initiation temperature at around 230C and maximum SHS temperature in diapason of 427C to 651C. Sample 7, second preparation method, has shown similar temperature profile to the samples 1-6. Samples 8 and 9 synthesised by the third method had higher SHS initiation temperature, 255C and, importantly, lower maximum SHS temperature, 360C. Different temperature profiles obtained for the applied synthesis methods affected the morphology of produced catalysts. Based on XRD data the averaged NiO crystallite size was found as 13,8 nm and 15.8 nm for the samples 8 and 9 correspondently, Figure 2.

It was shown Figure 2, the averaged size of the NiO crystallite for the samples produced by methods one and two has increased in two times and was found in the range of 30–37.6 nm. It is important to note that the content of the Ni phase for the samples 1 and 6 was very limited.

Results of the catalysts' efficiency test in the process of methane decompositions is presented in the Figure 3.



Fig. 2. XRD spectra of oxide form samples 1-9.

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Fig. 3. Dynamic of hydrogen concentration change in catalytic methane decomposition process with application of the samples 1–9.

The samples 1–7 were found as equally low efficient with initial hydrogen concentration detected at the level of 27–30 vo.% and a catalysts live time less than 5 hours. For the samples 8 and 9 the initial level of generated hydrogen was detected at 35–37 vol.% which was relatively stable for the first 10 hours of the process followed by the relatively slow deactivation kinetics, sample 9.

Higher efficiency for the samples 8 and 9 in compare to other tested samples can be explained by the smaller NiO crystallite size obtained with application of the third synthesis method.



Fig. 4. Electron microscopy investigation of the sample 9.

Thus the optimal procedure for the simple one stage synthesis of the efficient catalysts was identified as the third method.

Electron microscopy investigation, Figure 4, has confirmed formation of nano structured carbon materials Figures 4(a)-(d) with a "fish-bone" (e) morphology. The catalyst deactivation mechanism is blockage of an active phase by the deposited carbons, Figure 4(f).

#### 4. CONCLUSION

This study presented new experimental data on the development and optimisation of the simple, energy and cost effective solution combustion methods with application to the synthesis of catalytic systems for hydrocarbons decomposition aimed hydrogen and nano structured carbons production. It was found the total dissolution method noted as third in this work has resulted to the smallest size of the NiO crystallite which is appeared to be the key aspect for the high efficiency of the synthesised catalysts in the targeted application. The developed method contributes to SHS approaches application in nano technology and natural gas conversion research and application areas.

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# Community based indigenous people's human settlement preservation in Indonesia: a conceptual framework by Ragil Haryanto (4)

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# Community based indigenous people's human settlement preservation in Indonesia: a conceptual framework

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Recently, community-based approaches are widely applied in development activities especially in developing countries. Indonesia is no exception, there are efforts to take advantage of this approach in addressing issues related to the conservation of indigenous human settlements. To apply it in Indonesia with more than 1128 ethnic groups, of course this is not simple, each region has its own uniqueness, so this approach needs to be developed to better fit the context in which it will be applied. This article attempts to present a research result related to the development of indigenous people's human settlement in 17 regions of Indonesia. The research conducted by using qualitative approach aims to formulate the concepts of preservation of architecture and built environment of indigenous peoples and the concept of indigenous people empowerment. This article suggests 6 preservation concepts based on 3 categories of socio-cultural development of the indigenous peoples: first, the concept of preservation for indigenous peoples living in remote areas with original customs; second, the concept of rehabilitation and reconstruction for indigenous peoples living in transitional areas; and the third, the concept of revitalization and adaptation for indigenous peoples who have been living in urban areas.

**Keywords:** Community Based Development, Indigenous Peoples, Architecture and Built Environment, Preservation.

#### 1. INTRODUCTION

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As an archipelagic country, Indonesia has a diverse cultural richness, one of which is reflected in the uniqueness of the building architecture and the traditional settlement environment of each region. It can be one and play an important role as the identity of the Indonesian nation. Therefore, its existence needs to be conserved though not necessarily with a static conservation approach. Along with the ongoing developments that occur in the community, a more dynamic approach is needed as a conservation foundation to be implemented. The conservation framework requires careful assessment where there are parts to be maintained and which parts can be considered to be renovated, rehabilitated, reconstructed

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even if it is necessary to be demolished.

In the practical world, conservation activities for both buildings and traditional settlement environments must be seen comprehensively. Partial solutions will not bring optimal results and often just delay the issue that will bring new problems in the future. Economic considerations, especially in terms of financial aspects is a quite complicated part. On the one hand, the municipal government has a sustainable socio-economic mission to ensure that its citizens can still engage in their traditional settlement environment, but on the other hand, the financing for settlement activities necessarily requires relatively large funds.

Therefore, the area development approach and the

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optimization of various potentials are expected to balance between social mission and commercial interests which can be described as cross-subsidy between the two. To balance all the interests of these various aspects, it should be noted that the involvement of local communities is very important where the conservation activities will be implemented. Because they are the ones who better understand the values, character and history of their traditional settlements.

Based on previous experience, the problem of preservation of the Traditional Settlement Area arises due to the multidimensional interests. Each relevant stakeholder maintains the role and function of the region in accordance with their respective point of view.

Various aspects and stakeholders who have different interests and point of views can generally be grouped as follows:

- a) Technical Aspects of Operations: This aspect relates to the needs of a traditional settlement, such as the existence of cultural, supporting facilities and infrastructure.
- b) Regulatory Aspect: This aspect relates to the existing regulation or legal basis in Indonesia concerning housing and settlement areas and preservation of heritage buildings. Whether the regulation is sufficient or the need for new regulations for the handling of community-based settlements.
- c) Institutional Aspects: Institutions in the implementation of handling of the traditional settlements involved consist of central, provincial, district / village and village institutions.
- d) Aspects of Benefit / Economics / Finance: Economic implementation of handling requires the existence of data disclosure. This is because the funds come from APBN, APBD I and II, where all stakeholders need to know the funds are used for any activity.
- Aspect of Community Involvement: This aspect relates to the ownership of land and social communities in traditional settlement areas.

#### 2. INDIGENOUS PEOPLE'S HUMAN SETTLEMENT

Traditional settlements are often represented as a place of life of a community that still holds custom and cultural values associated with religious or religious values that are peculiar or unique to a particular society rooted in a particular place beyond the determination of history<sup>1</sup>. Traditional settlements are also often known as vernacular architectures, in which the word vernacular actually refers more to the concept of the social and economic structure of a traditional society<sup>2</sup>.

In line with that view<sup>3</sup>, states that the traditenal settlement environment as a community product, the form of settlement environment is the result of social agreement, not a product of person per person. This means that different communities pust have different characteristics of settlements. It is this difference that gives its own uniqueness to the traditional building, which can be seen from the orientation, the form, and the buil 2 ng materials and the religious concept behind it. <sup>4</sup>added that traditional settlements are assets of the region that can provide characteristics or environmental identity. The identity of the area is formed from the environment pattern, the built environment, the character of socio-cultural activities and the typical economic activities.

One interesting example can be seen in Sasak architecture, its traditional building also has its own uniqueness. According to<sup>5</sup> the factors that are considered very important in the planning and construction of traditional architecture Sasak is the scale and size of the building is calculated very thoroughly. In addition to the scale, the accuracy of the count of the size of each unit of the house is also a major concern, because it is believed to have an effect on the life of its inhabitants concerning safety, happiness, luck, fortize and so forth. The uniqueness is at once become one of the attractions for tourists. Therefore<sup>6</sup> explains that the objects of human works is a form of physical culture, including in it are traditional settlements and buildings.

Viewed from its physical form, <sup>7</sup>states that traditional settlements have characteristics or characteristics of the patterns of dispersion of settlements that can be categorized into several groups, namely the pattern of elongated form of settlement consists of elongated rivers, roads and lines beach; circular pattern of settlement; pattern of rectangular form of settlement; and the pattern of cube form settlements. The pattern of traditional settlements based on the pattern of sist distribution is also divided into two, namely the pattern of spread and the pattern of grouping. According to<sup>8</sup> spatial pattern of settlements as follows:

- Settlement patterns are spread far from each other, especially in newly opened areas. This is due to the absence of a large road, whereas people have a plot of land which for a given period must be cultivated continuously;
- The pattern of settlements by gathering in a village / village, extending to follow the road traffic (road / river), while the arable land behind it;
- The pattern of settlements collected in a village / village, while the land is located outside the village.

In addition to traditional settlements, other physical cultures can be seen from traditional buildings that are usually applied through traditional houses. According to<sup>9</sup> explained that the house building is part of a settlement. Another term for a traditional house is a traditional house or a people's home. Criteria for assessing the authenticity of traditional houses include habits that become an unwritten rule when a house is established or is being used. There are certain rituals such as the first pole erection 3 remony, selamatan / kenduri and proper timing, the direction of the house, the shape, the color, the decorative motifs, the building materia 3 used, the offerings, the prayers or the incantations to be read and so very closely related to traditional house.

#### 3. COMMUNITY BASED DEVELOPMENT APPROACH

Lately participatory or community-based approaches are widely discussed and even applied in development activities especially in developing countries. Indonesia is no exception, there are efforts to take advantage of this approach in addressing issues related to the conservation of indigenous human settlements. To apply it in Indonesia with more than 1128 ethnic groups, of course this is not simple, each region has its own uniqueness, so this approach needs to be developed to better fit the context in which it will be applied.

The issue of participatory approaches to development has gained much attention<sup>10</sup>, as well as to the paradigm of development policy in Indonesia including the indigenous people's human settlement preservation in Indonesia. <sup>11</sup> argues that one of the ker features of a participatory approach is to grant greater authority to the community as an end user to manage the autonomous available resources of development. As for measuring the participation or authorization to manage the development resources, many researchers still use<sup>12</sup> participation ladder as a framework for analysis. According to Arnstein, participation is related to the coeffect of power relations between one actor and the other in the decision-making process.

In the process of participation, it is not enough to explain why the decision was made (without involving them in decision-making itself) or to inform the decision only to the beneficiaries. The power in decision-making among these actors shall be based on the agreement from everyone involved. Thus, generally he divides the three levels of participation: first, the highest level in which the full power is on the hands of the people (degree of citizen power); second, symbolic participation (degree of tokenism), and third, the stage of manipulation of participation or no degree of participation (degree of manipulation or non-participation).

This article attempts to present a research result related to the development of the social and cultural life of indigenous peoples and their physical environment in 17 regions of Indonesia.

#### 4. METHODS

To achieve the objective of the research 5 his study applies qualitative research approach with case study research method. This case study research method is chosen because it is appropriate with the objectives of research which is to explore a phenomenon through a case<sup>13</sup>. The object of this research is the development of the social and cultural life of indigenous peoples and their physical environment in 17 regions in Indonesia: Aceh, Maluku Tengah, North Sulawesi, Kalimantan Selatan, Banten, Bali, Papua Barat, Kalimantan Tengah, Papua, Lampung, Sumatera Barat, Bengkulu, DI Yogyakarta, Riau, and Kepulauan Riau.

This research belongs to the "intrinsic case study14 and

it was undertaken in 2014 using qualitative method (case study) by collecting data through direct observation, indepth interviews with key informants, and analyzing secondary documents. In accordance with the case study research rule, the researcher is open to all data which are considered relevant and are able to explain the case under investigation. Data will be combined and be triangulated tested. The respondents are selected by applying purposive sample approact on several respondents who are directly or indirectly involved in the implementation of the activities in the study areas.

#### 5. RESULTS: A CONCEPTUAL FRAMEWORK

5.1 Concepts and Typology of Traditional Settlements

In order to preserve traditional settlements, a general conceptual framework is needed that can be a guide for all relevant stakeholders and able to accommodate the diversity of different characteristics of traditional settlements in different parts of Indonesia.

Based on the results of studies in 17 locations of traditional settlements in Indonesia which are the subject of this research (Aceh, Middle Maluku, North Sulawesi, South Kalimantan, Banten, Bali, West Papua, Middle Kalimantan, Papua, Lampung, West Sumatra, Bengkulu, DI Yogyakarta, Riau, and Riau Islands), it can be identified that not all traditional settlements in Indonesia still have strong characteristics as traditional settlements.

There are several characteristics that differ from region to region. These differences reflect the characteristics of the uniqueness of each traditional settlement. Therefore, it can be formulated 3 (three) groups of typology based on traditional settlement characteristic that is traditional, transition, and modern.

From these 3 typologies can be proposed a formula that can be used to classify the object of settlement environment of an area under study is by assessing some criteria with specific weights or scores. Traditional settlements that have high scores indicate that the settlements are still traditional or have strong character while the small scores indicate that the traditional settlements have undergone a transition and modern. The criteria consists of 9 Aspects: Community Characteristics; Livelihood; Religion and trust; Cultural Tradition; Religious Rituals; Customs (norms, sanctions, rules); Buildings & environments; Institutional Adat; Level of Openness to the Outer World.

The following are the criteria and weights used to determine the typology of traditional settlements.

Table.1. Criteria and Weights of Traditional Settlement

i jpologj 2 demination							
Aspects	Indicators	Weight					
Characteristics of	<ul> <li>Homogeneous communities with high levels of kinship and dependence on indigenous communities</li> </ul>	3					
society	<ul> <li>A homogeneous society with relationships and dependence on indigenous communities that</li> </ul>	2					

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Aspects	Indicators	Weight
	begin to decrease	
	- Heterogeneous societies that	
	have started to be independent of	1
	local indigenous communities	
	<ul> <li>Livelihoods are traditional and</li> </ul>	2
	even primitive (hunting,	3
	gathering and clearing forests)	
	subsistence-based agriculture	
	(farmers, fishermen or craftsmen	2
Livelihoods	who only meet their own needs)	
	- Modern urban / urban livelihoods	
	(farmers, fishermen or craftsmen	
	who are self-sufficient and	1
	outside, traders, entrepreneurs,	
	servents (ABPL and services)	
	- Own and still hold firm religion	
	or belief of local native ancestor	3
	- possess but no longer hold true	
Religion and belief	religion or beliefs of local origin	2
	- Do not have or local trust has	1
	begun to be abandoned	1
	<ul> <li>Have tradition from local and</li> </ul>	3
	still run with high intensity	2
	<ul> <li>Has a local tradition but is</li> </ul>	2
Cultural traditions	and is still often run	2
	Has a local tradition but has been	
	affected from the outside and is	1
	rarely executed	-
	- Have local rituals and still run	2
	with high intensity	3
	<ul> <li>Has local ritual but is influenced</li> </ul>	
Religious rituals	by outside ritual and still often	2
<u>6</u>	run	
	<ul> <li>Have local ritual but have been influenced from outside and</li> </ul>	1
	rarely run	1
	- Own and still hold firm local	
	customs and still strong run	3
Customa (norma	- Own but no longer hold firm	
sanctions rules)	local customs and customs began	2
sanctions, rules)	to be abandoned	
	<ul> <li>Do not have or local customs</li> </ul>	1
	have been abandoned	
	<ul> <li>Has local architectural buildings that are still maintained and still</li> </ul>	3
	accommodate local traditions	3
	- Has a local architectural building	
Buildings &	that is beginning to change and	
environments	traditional activities begin to	2
	decrease	
	<ul> <li>Has a local architectural building</li> </ul>	
	that began to change and its	1
	activity began to modern	
	<ul> <li>Still have local indigenous institutions with strong</li> </ul>	3
	authorities	5
Indigenous	- Still have local indigenous	
Institutions	institutions with decreasing	2
	authority	
	- Do not have local indigenous	1
	institutions	1
r 1 00	- Closed to the outside world	3
Level of Openness	- Open but there are limits to	2
to the Outer world	<ul> <li>Open to the outside world</li> </ul>	1

Remarks:

Total Score > 29 = Traditional Tipology

Total Score 21-29 = Transitional Tipology

Total Score <21 = Modern Tipology

From the results of a survey of 17 traditional settlements in Indonesia, it can be known the typology of each traditional settlement is as follows.

Table. 2.	Typolo	ogy of	17	Traditional	Settlements	in
		_				

2	Indonesia						
	Village	Score	Tipology				
	Sepa Village, Kec. Amahai, Kabupaten	39	Traditional				
	Mashohi, Maluku Tengah						
	Haruyan Dayak Village, Hantakan Sub-	37	Traditional				
1	district, Hulu Sungai Tengah Regency,						
	South Kalimantan						
	Baduy Tribe, Kanekes Village, District	37	Traditional				
2	Leuwidamar, Lebak Regency, Banten	25	T 114 1				
3	Sasak Tribe, Desa Perigi, Kabupaten	35	Traditional				
2	Lombok Timur Gianyar Regency	25	Traditional				
2	Mountains District West Papua	33	Traditional				
1	Kampong Naga Neglasari Village Kec	34	Traditional				
1	Selawu Kab Tasikmalaya West Jaya	54	riaditional				
3	Petulu Village. Ubud District. Gianvar	34	Traditional				
5	Regency, Bali	54	mannonai				
	Buntoi Village, Kahayan Hilir Sub-	33	Traditional				
2	district, Kab Pisau Island, Central						
	Kalimantan						
1	District of Ilaga, Kab. Peak, Papua	29	Transitions				
1	Pampangan Village, Gedong Tataan Sub-	24	Transitions				
	district, Pesawaran District, Lampung						
3	Nagari Sungayang, Tanah Datar District,	22	Transitions				
	West Sumatra						
2	Lubuk Kembang Village, North Curup	22	Transitions				
-	Subdistrict, Rejang Lebong Regency,						
	Germany Lubek Suken Ingin Jaw Sub	10	Madam				
1	district Aceh Beser District	19	Modern				
	Dopohario Village Ngaglik Sub-district	19	Modern				
3	Sleman Regency DI Vogyakarta	19	Wodern				
3	Tanggari Village, Air Madidi Sub-district.	19	Modern				
	Manado City, North Sulawesi						
2	Kampong Bandar, Pekanbaru City, Riau	18	Modern				
	Province						
1	Penyengat Island, Tanjungpinang City,	16	Modern				
	Kepulauan Riau						

5.2 The Concept of Conserving Traditional Settlements by Typology

Traditional settlements in Indonesia have different types of typology according to the character of each region. As has been explained previously, the 17 locations of traditional settlements studied can be grouped into three typologies: traditional, transitional, and modern settlement typology. All three have different characters so that in handling it will have different handling direction as well.

In general, the concept of preservation of buildings or neighborhoods can be grouped into several types including preservation, conservation, rehabilitation, reconstruction, revitalization, adaptation, restoration, and so on. Such preservation measures can be applied as directives in selecting suitable concepts on traditional settlement handling of each typology. Based on the research results conducted through direct observation and interviews with indigenous peoples as describe in the following table.

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Settlements						
Typology of	Concept of	Level of Physical				
Traditional	Conservation	Change				
Settlements						
Traditional	Preservation	Very small				
	Conservation	Small				
Transition	Rehabilitation	Medium				
	Reconstruction	Medium – Large				
Modern	Revitalization	Medium - Large				
	Adaptation	Large				

Table.	3.	The	Concept	of	Conserv	ing	Trac	litiona	ıl
			C - + +	1	+				

Here are the details of the concept of preservation according to traditional settlement typology:

- a) Preservation: It is the maintenance and maintenance of traditional settlements by maintaining the present condition and slowing the building and environment changes from the destructive process (keeping the reliability and functionality well maintained).
- b) Conservation: It is an effort to protect the building directly by cleaning, maintaining, repairing, physically and nonphysically directly from the influence of various damaging environmental factors.
- c) Rehabilitation: It is an effort to restore the condition of buildings that have been degraded / damaged / descended, so that it works again as before. With note changes can be made to certain limits, so that the building can adapt to the environment or current or future conditions.
- d) Reconstruction: It is an effort to restore the original appearance of a damaged / damaged area / building in accordance with the previous condition by using the remaining or salvaged materials with the addition of new building materials and making the building feasible to function and meet the technical requirements.
- e) Revitalization: It is a restoration activity aimed at obtaining optimal economic, social and cultural added value in the utilization of buildings and the environment in order to prevent the loss of city assets of historical value because the area is a decline in productivity.
- f) Adaptation: It is an activity to rebuild old buildings for new functions to save buildings and generally a big change especially changes to the organization of the space inside.

#### 5.3 The Concept of Community Empowerment Traditional Settlements

As explained earlier, traditional settlements to be handled can be grouped into 3 (three) typologies, namely traditional, transitional and modern. Referring to these three typologies, the empowerment approach or community-based settlement concept should also be divided into 3 (three) approaches, namely the territorialbased community approach, the combined approach of the territorial-based community and the interest-based community and the interest-based community approach.

#### 6. CONCLUSIONS

Based on the research results conducted through direct observation and interviews with indigenous peoples in the study areas, this article suggests 6 conservation concepts based on 3 categories of socio-cultural development of indigenous peoples: first, the concept of conservation and conservation for indigenous peoples living in remote areas with original customs; second, the concept of rehabilitation and reconstruction for indigenous peoples living in transitional areas; and the third, the concept of revitalization and adaptation for indigenous peoples who have been living in urban areas.

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