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Functioning of Free Rider for Community Resilience: A Social Capital Theory of Disaster

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Abstract

Based on field research on Kumamoto earthquake disaster, in this paper we focus on sociological problems around management of evacuation shelters. The key concept is social capital that captures dynamism of the social structure as the basic sociological scope for disaster. At first, by focusing on conditions for autonomous (successful in a sense) shelter management, we find four social capital elements and discuss importance of their combined effects to strengthen community resilience. The elements include volunteer among victims who are ordinary free riding on community management. Why free riders cooperate in emergency, in other words, why 'disaster community' appears? We answer this question in terms of two mechanisms within rational choice framework. At first, there is the overt urgent demand for solidarity at the time of disaster, which motivates everyday free riders to become volunteers. Secondly, standing on the view of divided supply of public goods, most free riders are 'quasi-free riders' whose levels of threshold for cooperation are relatively low. Thus, the free rider can be incorporated into the mechanism of social capital that strengthens community resilience against disaster.

Keywords: Disaster, social capital, free rider, community resilience

1. 2016 Kumamoto Earthquake

On April 14th ～16th 2016, huge earthquakes struck the Middle Kyushu in Japan. They were dislocation earthquakes caused by complex dislocations running in the Middle Kyushu, specifically in Kumamoto Prefecture. In fact in Kumamoto, the earthquakes over level six on the Japanese seismic intensity scale counted seven times in these three days. The main shock was on 16th with magnitude 7.3 and with seismic intensity 7 at maximum; however, the first shock on 14th, named as 'fore-shock' later, was also seismic intensity 7 even if the magnitude was 6.5. It was also a complex disaster because several heavy rains and typhoons in the following summer season brought serious additional damages on houses, fields, and residents.

Table 1. Summary of the 2016 Kumamoto Earthquake

Time (April 2016)	Epicentre	Magnitude	Seismic Intensity
14th, 21:26	Kumamoto	6.5	7
14th, 22:07	Kumamoto	5.8	6−
15th, 00:03	Kumamoto	6.4	6+
16th, 01:25	Kumamoto	7.3	7
16th, 01:45	Kumamoto	5.9	6−
16th, 03:55	Aso	5.8	6+
16th, 09:48	Kumamoto	5.4	6−

*) Only those exceeding JMA Seismic Intensity level 6.
Source: Japan Meteorological Agency homepage.

According to the damage situation report issued by Headquarters for Disaster Control of Kumamoto Prefecture (278th report, 13th August 2016), in Kumamoto Prefecture the number of deaths directly caused by the earthquake was 50, which followed by 216 related deaths. The number of damaged houses was totally 197,166, and 43,033 among which were serious cases of half or completely destroyed. **Figure 1** summarizes the number of evacuees and evacuation shelters between April 14th and May 31st, 2016. Peaks clearly appear during a week just after the second big one on 16th; however, it is also apparent that considerable number of evacuees still remained at the end of May. (2,273 in Kumamoto city, 2,728 in Mashiki town, totally 8,178 in Kumamoto prefecture.) The maximum number of evacuees was 67,201 in Kumamoto city (9% of the city population) and it was 16,050 in Mashiki town (47% of the town population). The maximum number of evacuation shelter was 256 in Kumamoto city and 15 in Mashiki town. As construction of temporary housing and supply of alternative houses had progressed, all shelters were closed until September 15, 2016, namely five months later.

2. Sociological Viewpoints for Disaster

In summer 2016 we organized a research project on Kumamoto earthquake disaster at the Faculty of Social and Cultural Studies and the Graduate School of Integrated Sciences for Global Society, Kyushu University. It is an interdisciplinary project in which members' disciplines range from social sciences to philosophy, literature, biology and geology. In order to make a record of earthquake experiences and support local activities for restoration and disaster prevention, we started fieldwork research of regional communities in Kumamoto city and Mashiki town since September 2016, and we have made interviewing with community leaders. Topics cover evacuation behavior, shelter management, restoration and disaster prevention; among which this paper focuses on sociological problems in regard with shelter management.

In sociology theoretical framework of disaster has not established yet. There are many descriptive case studies of damaged or reconstructed communities, support groups, and displaced persons; however, it is hard to find cumulative

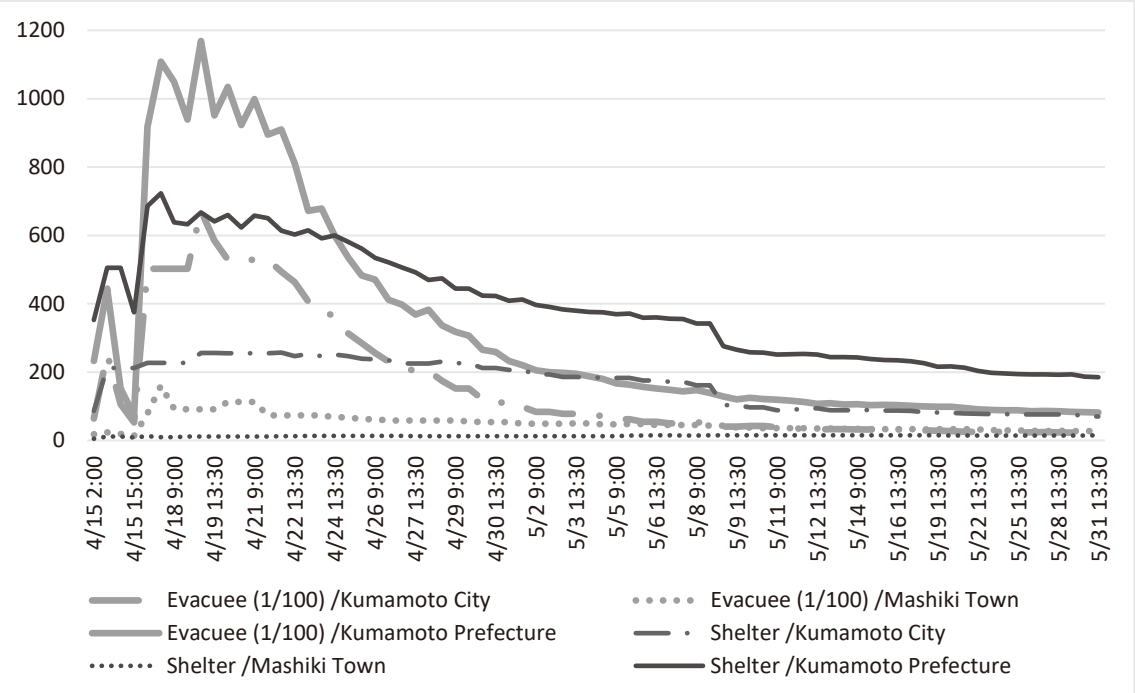

Figure 1. Situations of Evacuees and Evacuation Shelters in Kumamoto Earthquake

*) The unit of number for evacuee is 'person' (divide by 100) and it is 'case' for shelter.

*) The author made this graph based on the damage situation reports, Headquarters for Disaster Control of Kumamoto Prefecture: http://www.pref.kumamoto.jp/kiji_15459.html (8-14-2018 Updated.)

theoretical development across them. Discussion of risk society (Beck, 1992) provides an effective macro-theoretical framework; however, it is too general to analyze actual problems communities are confronted with. In the scope of middle range, sociological theories shall be reconstructed with the precondition of inevitability of disasters.

A basic sociological scope for disaster exists in compositions and dynamism of the social structure. This scope includes the following three viewpoints corresponding to prevention, occurrence, and restoration.

1) How to prepare for the (long term) unusual of the social structure.
2) How to make the emergency social structure work.
3) How to create a new rhythm of the social structure.

In order to effectively study disaster problems from this scope, we need some analytical conceptions that refer to social mechanisms in the social structure. Among such conceptions, in this paper we focus on social capital as the most important. The social structure at the time of disaster is not ordinary; it might be broken, temporary, and reorganized. Then we need to look at people's ties and their networks as the principle elements in order to explore flexible robustness of the social structure. For definition, social capital is every social resource in the social structure that generates additional values for actors within it (Coleman 1990, Misumi 2013). The accumulation of social capital takes place along socio-centric networks in the social structure and the key to enhance this process is people's cooperative behaviors. As we will discuss later, in case of disaster cooperation to produce public goods should have special significance.

Among a lot of studies that have focused on positive roles of social capital at the time of disaster, several researchers highlight the importance to link social capital with the concept of community resilience (Norris et al., 2008:135; Urano, 2010; Aldrich, 2012; Aldrich and Meyer, 2014; also see Nakagawa and Shaw, 2004; Carpenter, 2013). Community resilience is defined as "a process linking a set of networked adaptive capacities to a positive trajectory of functioning and adaptation in constituent populations after a disturbance" (Norris et al. 2008: 130-131). Substantially 'flexible robustness of the social structure' that we previously mentioned is very close to this definition. [1] Since the notion of resilience already has strong influence in the field of disaster policy making, social sciences have social responsibility to clarify the mechanism by which social capital conditions community resilience.

In this paper, we focus on the temporary community that appears in an evacuation shelter just after a disaster. Since a shelter community shall be generally based on a pre-disaster regional community in the same area, situations of shelter management influence on conditions for a post-disaster community. In this sense, a shelter community is intermediate rather than temporary. Thus, under the general concern on functioning of social capital for community resilience, we fix our first research question as follows: What kind of social capital accumulated in the social structure is useful for successful management of an evacuation shelter.

3. Social Capital in Evacuation Shelters

Through the first stage interviewing with administrators of the local government office, several institutions, and NPOs, we had recognized some 'successful' cases of shelter management. The standard of 'successful' in this case is simply that management is autonomous. Then, we have conducted interviewing with community leaders and with residents who were involved in management of this kind of successful shelters.[2] As a result we have extracted the following key social capital elements for autonomous management.

1) Leadership at the early stage.

Most of designated evacuation shelters were open by the leaders just after the first largest earthquake on 14th, and considerable number of people gathered in shelters regardless that destroyed houses and buildings were not so many at this moment. In sake of this quick correspondence, most shelters were on operation when the second largest one attacked on 16th and caused additional serious damages.[3] The leaders began autonomous management at the beginning with cooperation by sub-leaders, and even after 16th when refugees greatly increased, they continued this style by getting additional help of volunteers among refugees. Every leader says that if refugees get used to be helped by the

others at the beginning, they cannot regain independence. That is why consistent autonomy is important. Leadership indicates balanced accumulation of bonding and bridging social capital around some central actors. Without pre-existing social capital in the form of leadership, initiation of autonomous management seems difficult.

2) Personal networks bridging outwards and among leaders.

The leaders ordinarily have rich social networks within and out of Kumamoto, and they maximally utilized them to get information and to provide emergent supplies at shelters they managed. In the terminology of social capital, foundation of these productive relationships has been fixed by accumulation of bonding social capital; however, at the time of disaster their functioning as bridging social capital is important. Bridging relations are conditioned by trust and by norm of reciprocity as well. A typical case is that people who had got help from Kumamoto citizens at the time of disaster in the past give back help, namely directly reciprocal help exchange with time lag. Moreover, there are a lot of people who hold in mind debts of gratitude toward anonymous someone who helped them at the time of disaster, specifically in Hanshin-Awaji and East Japan earthquakes. These latently extended networks realized so many indirect help exchange based on generalized reciprocity.

Some leaders utilized networks of victims who helped shelter management as volunteers. In addition, since some leaders knew each other well, they could exchange information about situations of each shelter and precisely direct external volunteer groups to which shelter they shall bring what supplies.

3) Sharing visions of everyday life to be recovered.

Evacuation life in shelters longed for a month and more, even over three months in some regions. During the period people were enforced to live with strong feeling of unsafety and uncertainty in the broken social structure. Conditions for community restoration are different depending on the amount of damage; however, the point of spiritual resilience is whether people can positively imagine their recovered or new community life after the disturbance. Imagination of this kind decreases uncertainty about ending of the time of disaster, therefore works as mental support. It is a social capital element because people's memories and experiences that their community had rich social structure condition how clearly they can commonly imagine post-disaster everyday life. In a sense social capital conditions the potentiality of self- organization of the social structure. [4)]

4) Volunteers from victims

In addition, a noteworthy fact is that autonomous management involved volunteers from refugees, specifically those who had been in the periphery in daily community management. In fact even the leaders cooperated with them while not knowing who they were exactly. Put it differently, they are latent social capital. A series of fundamental services for community life are basically provided by the local government, but insufficiently. Therefore autonomous community management is necessary to complement them. Because of this public characteristic, services provided by resident organizations shall be available for every resident irrespective of his/her contribution to the management. It makes being in the periphery rational for many residents. In fact they are free riders in a sense that they enjoy community life without making contribution. Then, it is meaningful to restate our finding as follows; voluntary cooperation by free riders made autonomous management possible.

The last element evokes us findings of disaster community (or paradise) by Solnit (2009), the viewpoint of whom is very suggestive to consider functioning of the emergency social structure at the time of disaster. However, she only describes concrete situations in cases of hurricane Catalina and other disasters, and the task to clarify a mechanism of appearance of the paradise is left for social scientists, sociologists specifically. Why free riders in usual time voluntarily cooperate in emergency. Fixing this question as our second research question, in the rest of this paper we explore the logical explanation of this paradoxical phenomenon.

4. Conditions for Rational Volunteering

It is valuable to answer this question in the framework of rational choice theory for two reasons. At first, rational choice framework is directly related to the concept of social capital, because the latter conceptualizes the process that makes cooperation beyond self-interest possible. Secondly being based on rational choice makes it easier in reality to intentionally mobilize volunteers when necessary. In other words, the framework of rational choice makes it easier to put discussions in the context of policy making with regard to community resilience.

Disaster community appears at the time of disaster, but not always. At first we consider what characteristics of disaster activate social capital mechanism to motivate victims to be volunteers. Big disaster breaks down the ordinary supply system of fundamental goods and services, like as water and sewer services, electricity, gas, transportations, and foods. In addition at the aggregated level, it breaks public life conditions like as safety, amenity, cleanness, and trust in systems and institutions. The principal function of an evacuation shelter is temporally to provide these supplies and arrange life conditions for the sake of the refugees, as possible.

Generally supplies include two different types of goods. One is indivisible type like as public goods. Public goods are those goods provision of that requires contributions by everyone; although its consumption inherently cannot be limited to the contributors. Therefore, as rational choice theory has indicated, and as we have discussed with regard to community services in the previous section, the free rider problem is inevitable in managing public goods. In fact, above-mentioned fundamental goods and life conditions can be seen as public goods in a broader sense to include non-shaped goods. Following Hechter (1987) a group is solidary in proportion to how much it can supply joint goods (group-specific public goods) that are beneficial for the group members. Put it differently, group solidarity is the necessary condition for avoiding the free rider problem in supplying public goods.

The other type is divisible goods, which people ordinarily get through the market system as private goods. It is inevitable that functioning of the market downs (locally at least) at the time of disaster; as a rule, people have to depend on emergent supplies sent to evacuation shelters. Troubles people commonly encounter in this case are around distribution of supplies. In fact, various situations could happen at an evacuation shelter. Supplies are short running, then how we distribute them? There exist many stay-in-car refugees who do not stay in a shelter but float among shelters looking for supplies, then how we treat them? On what principle a distribution rule shall follow; equality, competition under equal opportunity, or putting priority to handicapped? If accepting group-demand principle, what group is adequate for the unit: family, neighborhood, or a randomly arranged group? Anyway, in order to fix a rule and a method of distribution, agreement among people is necessary to some degree. Again, group solidarity shall work to smoothly make an agreement.

Thus at an evacuation shelter demands for solidarity are concentrated; although, refugees cannot utilize usual community solidarity they have cultivated. Thus, the overt urgent demand for solidarity to provide joint goods moves everyday free riders to cooperate at the time of disaster.

Because of this difficulty, refugees tend to rely on dispatched municipal officers and external NPOs for shelter management. Such reliance, however, may close a chance to move everyday free riders toward volunteers. In addition, since disaster is a long term process including restoration and disaster prevention, it is important for refugees to have self-determined mind at the time of disturbance. Then, they will be able to decide by themselves the direction recovered community shall take in the future. In this sense social capital elements that we have extracted as the key for desirable shelter management are conditioning each other. More generally positive interactions between the four elements have special significance for community resilience.

5. Are They Really Free Riders?

Community management contains many aspects, and management of residential associations is a central but just one of them. When we discuss a community, we basically assume a regional community which scale is almost junior high school district of a city of considerable size. Management of a community of this scale shall include management of much kind of social groups and associations in addition to residential associations. They include PTA, hobby and

sports clubs, groups working on social welfare, various NPO, and so on. In a broader sense, more informal groups like as families, kin groups, and neighborhoods on the one hand, and more formal organizations like as companies, occupational unions, and local government on the other hand, can be seen as important units for community management.

A large scale community cannot realize strong solidarity in general; as a result, it cannot sufficiently supply public goods in the form of joint goods. That is why we generally rely on public services provided by local governments with regard to fundamental public goods. However, as we have discussed previously, there necessarily remain some public goods that citizens have to take responsibility for the supply. Let's look at the information system for disaster prevention as an instance of institutional type of public goods. The main part of the system may be controlled by the local government, but it necessarily depends on communication at the level of citizens in some respects. Except for traditional rural communities, it is impossible that a community complements the system by holding ordinarily high communication density among citizens as a whole. Instead, a well-functioning community may utilize subgroups as communication hubs in order to exhaustively and certainly spread and collect information.

It is like a division of collective responsibility in a sense that subgroups rather than a community as a whole take care of free rider problems respectively.[5] In this case, the most important management issue for subgroups is to hold solidarity to certain degree and contribute to a community they belong to by creating joint goods, when it is necessary. Founded on this viewpoint of divided supply of public goods, community solidarity appears as a union of subgroup solidarity.[6] This is a kind of decentralization of resources, namely module structure that we have discussed as an important condition for a resilient community (see footnote 1).

People cannot participate in all the subgroups; instead, they may actively participate in a few favorite ones. As a result, it ordinarily happens that a contributor to solidarity of a specific social group or association is not an active member in other social groups and associations. Volunteers among victims whom we have seen as free riders in everyday life community management may positively contribute to production of joint goods in other respects. Then, they are not free riders anymore.

In theory, everyone can be a contributor and a free rider at the same time in different scenes in community life; however, in reality we shall consider a grade among free riders. On the one hand, there are core citizens who contribute on joint goods of various kinds by participating in many subgroups; on the other, there are completely free riding citizens who do not participate in any subgroup. As the subgroup widely includes family and work place, most citizens will make contribution in one or a few subgroups; therefore they are located intermediately between the extremes. We call these intermediate citizens 'quasi-free rider.' (See **Figure 2** for visual image of this concept.)

A noteworthy point is that the probability of highly graded quasi-free riders being got together at the same shelter is not generally low. Since a highly graded quasi-free rider is ordinarily active in multiple subgroups, he/she is supposed to be ready for emergent participation in the shelter management. In other words, the level of his/her threshold for cooperation is relatively low (Granovetter, 1978). Thus, an evacuation shelter could be the place where not only the

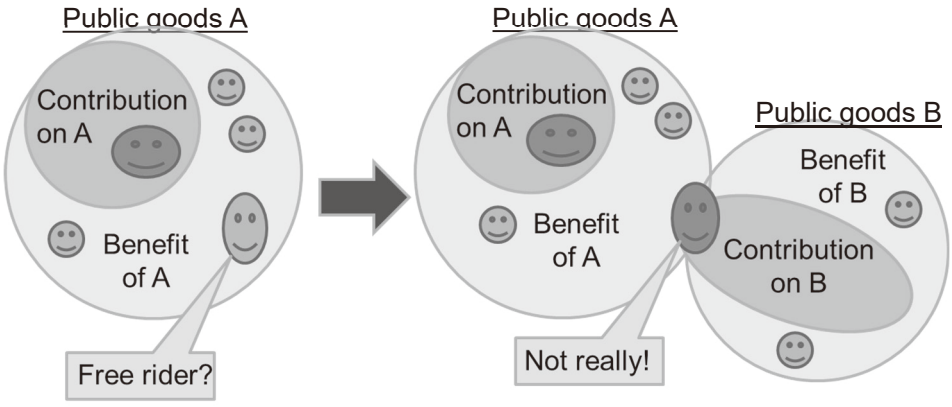

Figure 2. Divided Supply of Public Goods and 'Quasi-Free Rider'

overt urgent demand for solidarity is salient, but also ordinarily dispersed quasi-free riders get together. As we have suggested, under the condition of autonomous management, latent social capital of this kind is more easily activated. That is why the leaders in our case of Kumamoto could successfully get support by volunteers from quasi-free riders among refugees.

6. Concluding Remarks: Free Riders Strengthen Resilience

Through original fieldwork of successful cases of evacuation shelter in Kumamoto earthquake disaster, we have confirmed four social capital elements that made autonomous management possible: 1) leadership at the early stage, 2) bridging personal networks outwards and among leaders, 3) sharing visions of everyday life to be recovered, and 4) volunteers from victims. Each of the elements may have independent effect, but positive interaction between them shall have greater significance from the long term viewpoint.

When we consider strengthening community resilience against disaster in terms of the combined effects of these social capital elements, we need pay attention to a paradoxical aspect that the fourth element has. In fact, since the volunteers are ordinarily free riding on community management, we need to explain why they voluntarily cooperate on shelter management at the time of disaster. Holding rational choice framework, we have focused on two mechanisms. At first, there is the overt urgent demand for solidarity at the time of disaster, which motivates everyday free riders to become volunteers. Secondly, standing on the view of divided supply of public goods, most free riders are actually 'quasi-free riders' whose levels of threshold for cooperation on public goods are relatively low.

Especially at an evacuation shelter, the probability that a lot of quasi-free riders in various fields accidentally get together is not low; as a rule leaders can efficiently get volunteers among them for various purposes. These mechanisms are not specific to shelters, but are generally applicable to explain 'disaster community.' Discussions of 'disaster community' are to be easily connected with altruistic nature of human beings. A criticism of our viewpoint is that apparently altruistic behaviors could be explained as contributions to public goods in rational choice framework. Put it differently in the context of resilience policy, it is not necessary to appeal to people's sympathy in order to stimulate them to be volunteers.

Another implication is that it is not necessarily reasonable to normalize 'disaster community.' Normalization means that people ordinarily hold high-level cooperative attitudes in everyday life. A community of this type should have the high-level solidarity, probably in terms of strong norms and effective sanction systems.[7] Rather, holding free riders in community and in each subgroup as well may more excellently function for disaster prevention and restoration. This is because free riders, quasi-free riders specifically, generally have considerable potentiality to become cooperators in emergencies. In order to reserve this latent social capital, people are expected to be tolerant of free riding each other in consuming joint goods.

On the other hand, holding free riders shall not result in fixing a specific group of people as the free rider constantly. Suppose we introduce some institutional devices to strengthen community resilience by admitting free riding. The key of the institutional design will be how to preserve quasi-free riders in an adequate way. In this case discussion by Durkheim (1912) on collective consciousness is suggestive. Always keeping solidarity strong enough to restrict free riding requires a lot of cost, not only for individual members, but also for the group as a whole. Rather, it is rational for a group to hold free riders by terns, making a rhythm of boiling and cooling down effectively. In section 2 we have indicated rhythm of the social structure for the important sociological scope. This is why it functions to reserve latent social capital resources and makes it easier to mobilize them in emergencies like as disaster.

Thus under some restrictions the free rider can be incorporated into the mechanism of social capital positively. Further research is required in order to specify the method of adequately holding quasi-free riders more in details. As a starting point we conclude that the free rider, together with other social capital elements, could strengthen community resilience against disaster.

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Footnotes

1) As Zolli and Healy (2012: Introduction) says, robustness is not same as resilience. A robust system may be hard to be destroyed, but it cannot autonomously repair itself when destroyed. Moreover, it is not necessary that the system must be restored exactly as it was. Strictly speaking, a flexibly robust community is resilient only when it is equipped with a module structure (decentralization of resources) and dynamic function of autonomous restoration (with changeability to some degree).

2) Leaders include chairman and officials of resident associations, the heads of community centers and other half-governmental institutions, and the principals of elementary schools who take responsibility of the architectures that are used for shelters. It is noteworthy that there appeared many non-designated emergency shelters in city area and they played important role at the early stage of disaster, especially for vulnerable people.

3) In a sense it was a precious chance for shelter managers to find shortage of supplies in the emergency supplies storehouses before the center stage of shelter management.

4) This element is very close to 'collective narratives' that Chamlee-Wright and Storr (2011) discuss as the important form of social capital in the phase of post-disaster recovery. Izumi (2015) also points the importance of rituals from the viewpoint of social memory as social capital.

5) It is not equal to division of public goods. Public goods of high publicity in fact may circulate throughout the community nevertheless they are supplied as join goods in terms of a single social group.

6) High integration of a rural community implies that 'union' resembles 'accumulation' because of membership duplication between subgroups.

7) Or it requires people to have high-level ability of sympathy.

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