Responses to Reviewer 1.

Review

The authors used mixed quantitative and qualitative methods to investigate the integration of explicit and tacit strategies for PAC livelihood recovery. The manuscript is well-organized on this interesting topic.

Response: Thank you. We dedicate to it.

Here are the responses:

1. The Introduction section could be more succinct. Since the focus of this paper is Upper Cisokan Pumped Storage (UCPS), the first three paragraphs on the history of large dams should be shortened to one paragraph. This also applies to the first four sentences in the Abstract.

   Thank you for comment. We make it more succinct regarding the first three paragraphs on the history of large dams to be one paragraph.

   North American and European countries built many large dams until 1975, after which both began to abandon most of the installed hydropower due to negative social and environmental impacts. 546 dams were dismantled in the United States from 2006-2014, and thousands in Europe [1], [2]. This situation contrasts with what is happening in developing countries, which have increased the construction of hydropower dams for decades. Cirata was the first reservoir built by the Government of Indonesia in 1957 and operated in 1967. Very deservedly, during the 1960-2020 period, no less than 235 large-scale dams were built in Indonesia.

2. The research gap and key contributions of this manuscript should be summarized and presented at the end of the Introduction section.

   Yes. Thank you. It has been revised.

In real terms, the project manager always works with stakeholders to restore the livelihood and income of the PAC. However, often the operations are carried out top-down and instantaneously, so it is unsustainable and even fails. Therefore, a circular and sustainable community livelihood and income recovery design are needed, integrating strategies designed from the outside (explicit strategy) with PAC adaptation strategies (tacit strategy). Through this strategy, PAC livelihoods can recover through this strategy, and negative social, economic, and environmental externalities from UCPS can be reduced or even eliminated [16]–[20]. An integrative PAC livelihood recovery solution pays attention to sustainability and diversity and anticipates the impacts of climate change and other risks [21]. This strategy included meeting the needs of food, clean water, energy, and others. Livelihood recovery must anticipate the loss of resources, habitat, biodiversity, irrigation networks, infrastructure, and access to services [22]. An integrative strategy is essential to reduce PAPs' environmental and social costs. This paper aimed to identify the integration of "tacit and explicit" strategies in collaborative, circular, and sustainable PAC UCPS livelihood recovery

3. The first paragraph in the Discussion section (lines 242-244) should be removed.

   Thank you. It has been removed.

4. The last paragraph in the Conclusion section (lines 664-665) should be removed. In addition, the information on the "Informed Consent Statement", "Data Availability Statement", and "Acknowledgments" should be updated.

Thank you. The last paragraph in conclusion section (line 664-665) has been removed. The additional information has been updated.

5. The manuscript needs to be carefully proofread to avoid mistakes. For instance, "during peak load times" appeared twice in lines 76 and 77. Citations in line 108 (Scott et al., 2022) should be referenced by numbers. Reference #25 in lines 746-747 needs to be updated.

   Line 76 and 77 has been revised. Become 70-71

   UCPS is a "Pumped Storage" constructed by two dams, consisting of an upper pool and a lower pool. During peak load times, the lower pond water will be pumped into the upper pond, and the upper pool water will be released to drive the turbine.

   The citation in line 108 (Scott et al) has been change by number

   construction of large dams is often oriented toward providing energy for industrial and urban population growth while paying little attention to socio-economic and environmental impacts **[13].** The irony is that people affected by projects often do not get electricity because they do not get services from large dams. Whoever agrees that all countries need sustainable energy, hydropower plant is part of this portfolio.

   Reference #25 in lines 746-747 have been updated

   R. Savaya and O. Cohenn, "A Qualitative cum Quantitative Approach to Construct Definition in a Minority Population : Reasons for Divorce among Israeli Arab Women A Qualitative cum Quantitative Approach to Construct Definition in a Minority Population : Reasons for Divorce among Is," *J. Sociol. Soc. Welf.*, vol. 25, no. 4, pp. 156–179, 1998, doi: 10.15453/0191-5096.2531.

Comments on the Quality of English Language

The quality of English is satisfactory, though many sentences could be more succinct.

sustainability

MDPI

Type of the Paper (Article)

Integration of the "Tacit and Explicit Strategy" in Sustaining the Livelihood Recovery of Rural Communities Impacted by the "Upper Cisokan Pumped Storage (UCPS)" Hydropower Plant Project in West Java, Indonesia

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Abstract: Since the 1970s, large-scale dam construction has become a trend in developing countries. During the 1960-2020 period, 235 large-scale dams were built in Indonesia. However, all of them left a negative socio-economic impact. Explicit strategies to restore Project Affected Communities (PAC) livelihoods have been implemented but need to sustain. In 2011, the Pumped Storage innovation was adopted, and Upper Cisokan, West Java became the pilot. The recovery of PAC livelihoods is also designed to be sustainable by integrating a "tacit and explicit strategy." This paper aimed to determine the implementation and impact of this strategic innovation. The research was designed through a survey of 325 PAC families (975 persons) and in-depth interviews with 32 informants. Data was analyzed using descriptive statistics and dialectics. The result revealed that strategy integration could speed up the post-resettlement livelihood recovery time and collaborate with various local institutions in the Academics, Businessmen, Community, Government, Media (ABCGM) scheme. Besides, increasing the number of PAC livelihoods by 155 percent and expanding the divercity of livelihoods from agricultural domination to MSMEs and the non-agricultural sector. The involvement of women and youth in livelihood recovery has also increased by 85 percent, especially in Micro, Small, and Medium Enterprises (MSMEs) and the non-agricultural sector.

Keywords: integrated; PAC livelihoods; recovery; sustainable; tacit and explicit strategy

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1. Introduction

North American and European countries built many large dams until 1975, after which both began to abandon most of the installed hydropower due to negative social and environmental impacts. 546 dams were dismantled in the United States from 2006-2014, and thousands in Europe [1], [2]. This situation contrasts with what is happening in developing countries, which have increased the construction of hydropower dams for decades. Cirata was the first reservoir built by the Government of Indonesia in 1957 and operated in 1967. Very deservedly, during the 1960-2020 period, no less than 235 large-scale dams were built in Indonesia.

If in the 1960-2000 period, construction of dams was concentrated on the islands of Java, Sumatra, Kalimantan, and Sulawesi, then in the 2000-2020 period, it spread to the islands of Bali, West Nusa Tenggara, East Nusa Tenggara, Maluku, and Papua. The Government of Indonesia has planned the construction of 15 large weirs in the 2021-2025 period. Very deservedly, during the 1960-2020 period, no less than 235 large-scale dams were built in Indonesia. Even though all dams were built in modern times (1960-2020), the technology is different. If the reservoirs built during the 20th century (1900-2000) are large, then those built in the 21st century are relatively small.

Weirs are designed to be relatively small due to Pumped Storage (PS) innovations. PS is the only utility-scale electricity storage technology widely adopted worldwide, especially in developed regions [3], [4]. One of the leading technologies of PS is the design and manufacture of reciprocating pump-turbine runners. Until 2018, pumped PS remained the dominant large-scale energy storage source (96 percent) of global energy capacity [5]. PS is seen as climate adaptive and prospective, as it becomes an integral part of the power grid to increase stability, elasticity, efficiency, and sustainable energy penetration [6].

Upper Cisokan Pumped Storage (UCPS) is one of the first modern dams in Indonesia that is small in size but produces enormous power. UCPS is like a giant battery that can store 1040 megawatts of electricity. This battery capacity is the largest power plant in Indonesia because it outperforms the Cirata hydropower plant, which only produces 1008 megawatts of power. UCPS has the first power system using Pumped Storage technology in Indonesia. This power system is a dam innovation that makes hydropower plant function as "power storage." Besides being very efficient, it is also reliable to activate, especially during peak load conditions.

UCPS is a "Pumped Storage" constructed by two dams, consisting of an upper and lower pool. During peak load times, the lower pond water will be pumped into the upper pond, and the upper pool water will be released to drive the turbine. UCPS, with this system, is the first to be implemented in Indonesia. UCPS works to store energy when the base load reaches off-peak to provide reliable capacity at peak load by pumping water from the downstream reservoir to the upstream reservoir as energy storage [3], [7].

The capacity is a manageable size but is designed to generate immense energy. UCPS was built on the Cisokan River, a tributary of the Citarum River in West Java. The construction of UCPS requires a total land area of 668.31 hectares which divides the two districts, 522.64 hectares each in Kab. West Bandung and 145.67 hectares in Kab. Cianjur. Land Acquisition and Resettlement Operations (LARAP) for project-affected communities began in 2011 and were completed in 2013. This project includes land acquisition for access to locations and biodiversity protection areas.

Through technological innovation, "pump storage," UCPS does not need land and water on a large scale. In addition, it also does not eat many puddles. The advantage is that weirs can be built on large rivers with large discharges and capacities but have the opportunity to be developed on medium-scale rivers and tributaries [8]. Weirs are built in stages, upper and lower. Both are used to hold water and drive turbines. The difference is that water from the lower will be pulled back to the upper at night by using excess electrical energy, which will be reused to drive turbines [9], [10].

"Pump storage" technology is expected to be a solution to problems arising from the construction of large-scale conventional dams, such as deforestation, degradation of aquatic and terrestrial biodiversity, increased emission of greenhouse gases, displacement of thousands of people's settlements, conversion of agricultural land and the loss of people's livelihoods due to hit by the project. Furthermore, it can minimize the impact of damage to social systems, environmental systems, and loss of livelihoods for local communities [11]. With that, livelihoods and sources of income for the community are sustainable.

The relatively small scale of UCPS can minimize adverse social, economic, and environmental impacts, thereby saving on the cost of building a weir [12]. In contrast, the

construction of large dams is often oriented toward providing energy for industrial and urban population growth while paying little attention to socio-economic and environmental impacts [13]. The irony is that people affected by projects often do not get electricity because they do not get services from large dams. Whoever agrees that all countries need sustainable energy, hydropower plant is part of this portfolio.

Ideally, innovative and sustainable solutions are also created to solve the problem of the negative impacts of dam construction, primarily related to the recovery of livelihoods and incomes of project-affected communities (PAC). PAC lost their homeland and long-standing livelihood and business [14]. PAC is challenging to get a new livelihood in a new settlement location, so they choose migration. Few PAC has lost their resources and livelihood because they need help managing compensation money. Their livelihood status has decreased from owner to laborer in the rural informal sector [15], [16].

In real terms, the project manager always works with stakeholders to restore the livelihood and income of the PAC. However, often the operations are carried out top-down and instantaneously, so it is unsustainable and even fails. Therefore, a circular and sustainable community livelihood and income recovery design are needed, integrating strategies designed from the outside (explicit strategy) with PAC adaptation strategies (tacit strategy). Through this strategy, PAC livelihoods can recover through this strategy, and negative social, economic, and environmental externalities from UCPS can be reduced or even eliminated [17]–[21]. An integrative PAC livelihood recovery solution pays attention to sustainability and diversity and anticipates the impacts of climate change and other risks [22]. This strategy included meeting the needs of food, clean water, energy, and others. Livelihood recovery must anticipate the loss of resources, habitat, biodiversity, irrigation networks, infrastructure, and access to services [23]. An integrative strategy is essential to reduce PAPs' environmental and social costs. This paper aimed to identify the integration of "tacit and explicit" strategies in collaborative, circular, and sustainable PAC UCPS livelihood recovery.

2. Materials and Methods

The study uses an integrated design (mixed method), with a quantitative dominant and less qualitative [24]. [25], [26] confirmed that the best way to obtain reliable knowledge of different population groups is to combine quantitative and qualitative insights. For this reason, many methods were used: literature reviews, structured surveys using validated questionnaires, participatory observation, in-depth interviews using guidance interviews, and focused discussions. The research was conducted at UCPS West Java Province (Figure 1).

The population in this study numbered 2,172 households, according to the 2013 LARAP report. Of these, around 623 households moved outside the UCPS location, and 1,549 households remained in the location with residences spread across five points, namely the upper dam, lower dam, access road, new infrastructure, transmission lines, and resettlement sitesv [27]. Based on the initial population (UIP, 2013) and using a sampling technique of 15 percent of the total population. 325 families were taken as respondents. Of these, 52 families came from Cipongkor District and 230 families from Rongga District, West Bandung Regency, while 43 families came from Campaka District, Cianjur Regency.

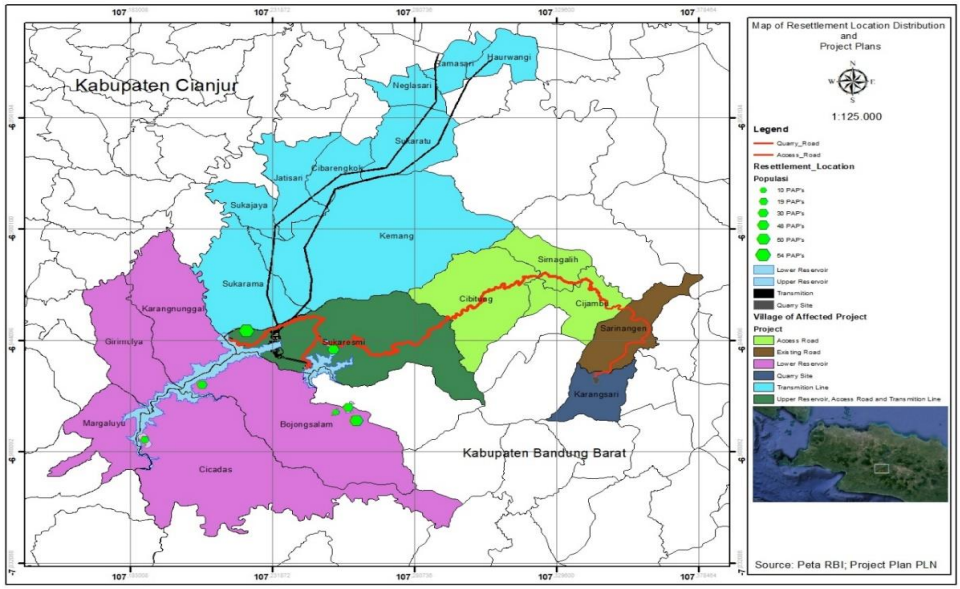

Figure 1. Location and number of new resettlements for field works (google earth and ground check, 2020). Location of the eight villages: Pasir Laja, Pasir Jegud, Santik, Cidongke, Munjul, Cangkuang, Gunung Batu, and Kampung Jolok

A total of 32 informants were chosen deliberately, with details of 1 representative from DMU & PIU and six representatives from the West Bandung and Cianjur Regency governments handling PAC's economic recovery. Then 4 sub-district representatives, 6 village managers, 2 local security officers, 4 PAC cooperative administrators, 2 community empowerment people, 1 banking administrator, and 1 PT representative. Perhutani, 2 farmer group administrators, 2 MSME group administrators, and one consultant for PAC economic recovery. Apart from being interviewed, the informants were also involved in the FGD.

Primary data was obtained from the survey, tabulated, made diagrams, and analyzed descriptively. Primary data obtained from in-depth interviews, observations, and focused discussions, were selected, explicitly presented in the form of inboxes, and analyzed dialectically. The review result of the implementation of the PAC economic recovery for ten (10) years (2013-2022) was also presented in addition to primary data. In general, the results of an integrated study are justified through theoretical analysis, both ethical, emic, and dialectical; Second, through consultation with experts or reviews; and third, through public consultation with research participants. The research was conducted for one year, starting from August 2021-August 2022.

3. Results

5.1. PAC Livelihood Recovery Explicite Method

The explicit method of restoring the livelihood of PAC is carried out through mentoring schemes and stimulant capital assistance. There were five assistance phases: The first phase (2011-2012), facilitation of identification of business interests as a basis for grouping PAC and business training for pilot groups. The training focuses on agriculture, animal husbandry, forestry, fishery, product processing, construction labor, trading business, and management of economic institutions. Apart from that, a stakeholder analysis was also carried out for the implementation of *Community Involvement and Development* (CID).

The second phase (2013-2014) is entrepreneurship training, preparation of business plans, and strengthening PAC access to capital services. The training focused on the effectiveness and efficiency of using compensation money, developing sheep farming, fish farming, honey bee farming, banana chip, and palm sugar businesses. Training is given to farmer groups, small businesses, and women farmers. The training continued

strengthening PAC's access to health services, markets, clean water, secondary and senior education, transportation, information, and the internet.

The third phase (2015-2017) facilitated the strengthening of three PAC cooperatives, two agricultural MFIs (86 members of families), one livestock LKM (25 members of families), and one entrepreneurial MFI (54 members of families). Priority on the effectiveness of the realization of venture capital assistance (Rp 7.5 million/KK) and the growth of new businesses. Capital assistance is focused on agro-complex-based micro businesses, inputs (seeds, fish/plant/livestock seeds, tractors), compost, and food processing. Capital reinforcement was given to the men's group for agro-complex, while processing and handicrafts were given to the women's farming group.

The fourth phase (2018-2022) is strengthening community access to productive resources, especially infrastructure and socio-economic support facilities. Around 56 related programs were implemented. Thereby increasing the quality and quantity of district roads, village roads, neighborhood roads, bridges, irrigation networks, clean water networks, worship facilities, health facilities, refueling facilities, energy service facilities (gas), and biodiversity protection facilities. As a result, there was business chain efficiency and the expansion of the PAC communication network, so access and income increased.

The fifth phase (2021-2022) is strengthening business networks through structuring superior product business documentation, business administration (labeling, barcodes), and online marketing. Focus on locally processed food products, such as banana chips, palm sugar, honey, black rice, and brown rice. The galleries and websites were developed and marketed through district and regional exhibitions to expand the market for processed food and handicrafts made of wood or bamboo. PAC business group product branding is also carried out through Facebook, Instagram, and YouTube social media

5.2. PAC Livelihood Recovery Explicite Strategy

Table 1 Implementation, Outputs, and Outcomes of PAC Livelihood Recovery Strategy

No	CD activity	Realization and Existence								Outputs and Outcomes
		2014	2015	2016	2017	2018	2019	2020	2021	2022	
1.	Training (Capacity Building):										
	a. Business plan preparation training according to interest	+++	+++	+++	++	++	++	+	+		Business plan and venture capital assistance
	b. Processed food product packing training				+++	+++	++	++	++		Products can be marketed more widely but need to be more stable.
	c. Compost-making training					+++	+++	+	++	++	Compost and increase in farm production
	d. Marketing network development training					+++	+++	++	++		Build galleries and participate in exhibitions.
	e. Online-based marketing training							+++	++		Web and online marketing applications
	g. Cooperative management and benchmark training							+++	++		The management and operation of the PAC cooperative were formed
2.	Business capital assistance:										

a. Stimulant funds of Rp. 7.5 million / PAC family	+++	+++	+++	+++	+++	+++	+++	PAC has been accepted and managed by the PAC cooperative as capital
b. Cultivating fish according to interest			+++	+++	++	++	++	Growing fish farming business, but not yet sustainable
c. Goat assistance (livestock group)				+++	+++	++	++	Developing the livestock business, diversifying the PAC business
d. Assistance of 5 units of hand tractors (group of farmers)				+++	+++	+++	+++	Increasing work productivity and efficiency of farm laborers
e. Assistance with ten units of water pumps (farmer groups)				+++	+++	+++	+++	Increased production, especially in the dry season
f. Making a gallery of wood/bamboo crafts					+++	+++	+++	Build galleries and promote products.
g. Assistance with work equipment for wood/bamboo craftsmen					+++	+++	+++	Increasing the quantity and quality of wood/bamboo crafts
h. Assistance of plant seeds for social forestry l						+++	+++	Plant seeds are available for community-based conservation.
i. Scholarship assistance for outstanding PAC children				+++	+++	+++	+++	Increasing the number of higher education graduates
3. Independent Work Development Clinic:								
a. Wood/bamboo craft coaching					+++	+++	+++	Developing wood and bamboo craftsmen, quality according to the criteria.
b. Motorcycle and electronics workshop coaching								Developed automotive and electronic repair shops
c. Sawmill and furniture coaching					+++	+++	+++	Developed sawmill business and furniture business

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5.3. PAC Livelihood Recovery Tacit Strategy 206

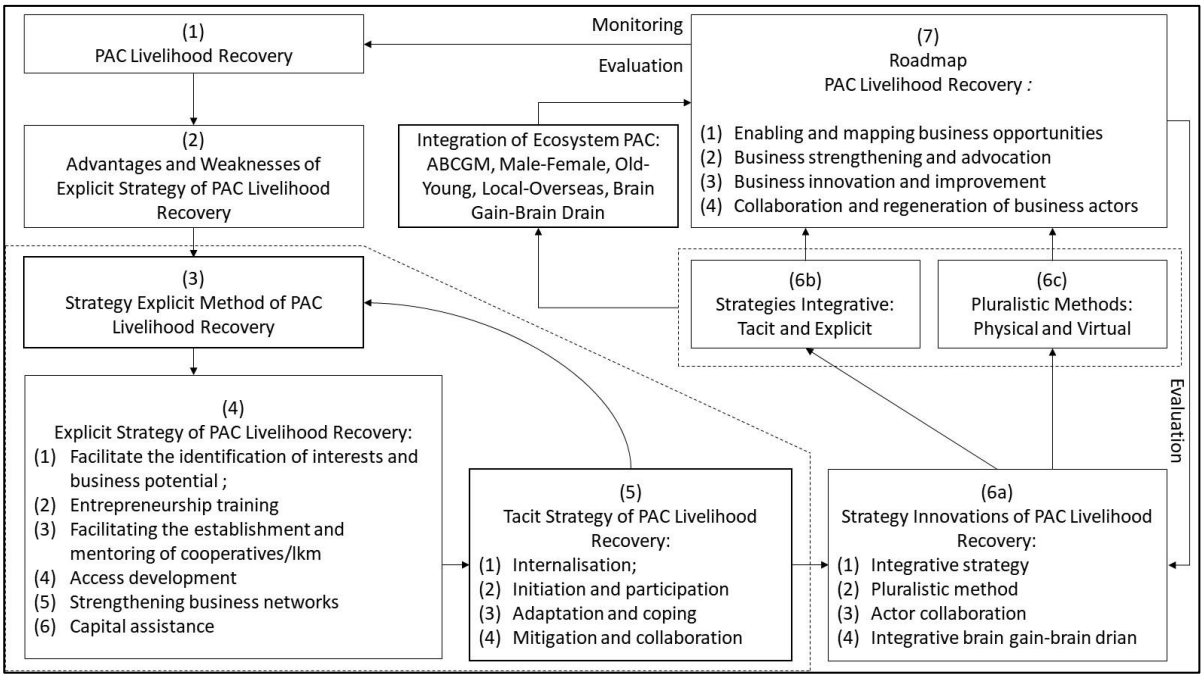

Figure 2 The PAC Livelihood Recovery Strategy Integration Tacit-Explicit Method

5.4. Impact of Explicit and Tacit Integration Strategy for PAC Livelihood Recovery

Table 2 Comparative Analysis of the Livelihood Conditions of PAC Before and After UCPS

No	Livelihood Aspect	Before UCPS	After UCPS
1	Living conditions	Stage (70%), permanent (20%), and semi-permanent (10%)	Stage (40%), permanent (40%), and semi-permanent (20%)
2	Economic capital	Informal sources (60%), dealers (25%), and 15% formal.	Informal sources (70%), non-formal (20%), and 10% formal.
3	Social capital	Local and reciprocal norms are high (80%), but external networking is weak. Land tenure relations are 60% owned and 40% cultivated	Local and reciprocal norms fade (60%). Formal norms, networking, and collaboration are widespread (40%). Land tenure relation 75% owned
4	Natural capital	85% of the economy is based on natural resources, paddy fields, fields, and forests. 15% other sectors	60% of the economy is based on natural resources, and 40% is in other sectors. Paddy fields converted 20% and dry land 20%.
5	Institutional capital	80% of decisions go through local institutions, while only 20% of formal institutions	55% of decisions go through formal institutions, while local institutions drop to 45%.
6	Source of income	85% agriculture, animal husbandry, and primary forestry, while 15% MSME and non-agricultural sectors	80% agriculture, animal husbandry, and primary forestry. 20% MSME scale agro-industry and 55% non-agricultural sector

7	Land access	Private and state land is available within the scope of the village, with affordable purchase and rental prices.	Private and state land is available inside and outside the village, the land purchase price has increased by 50-100%, and the cultivated area has narrowed.
8	Road access and transportation	Passed by rough paved village roads (30%), cobbled village roads (30%), and dirt alleys (40%). 40% of four-wheeled transport and 60% of modified two-wheeled vehicles	Hotmix roads (40%), asphalt and concrete village roads (40%), and concrete alleys (20%). Four-wheeled (80%) and two-wheeled (20%) transportation.
9	Access to the marketing of agricultural products and MSMEs	80% is sold to middlemen and 20% to the local market	40% sold to middlemen, 30% to the local market, 25% to a wholesale market, 5% retail
10	Access to health services	About 60% is hard to reach. There is only one Puskesmas (Publict Health Center) per sub-district	About 80% access to *Posyandu (integrated Service Post)*, village midwife, health center, and hospital.
11	Access to educational services	Only 2% have higher education, 20% secondary, and 75% have elementary	About 10% have tertiary education, 40% are in middle school, and 50% have elementary schooling
12	Information access	Only 35% internet access, limited cellular network, and blank spots	65% internet access, 75% good access to the network, and 25% not good.
13	Access to Capital	Family (85%), bank (10%), dealer (3%), and moneylender (2%)	Families (53%), cooperatives (30%), banks (10%), traders (5%), and investors (2%)
14	Access to employment or business	70% in agriculture, forestry, plantation, and animal husbandry. 15% trading (stalls and distribution. 3% palm sugar craftsmen, 3% construction workers, 2% transportation services, 2% government employees, 2% local migrant workers, and 1% international migrant workers.	60% in the agricultural sector. 17% trading (basketball stalls, convenience stores, traveling sellers. 5% chips artisans, furniture, workshops, cell phone counters, convection, rice stalls, transportation, logistics, and retail fuel. 5% material shops, distributors, and sawmills. 2 % construction workers, 2% civil servants, 5% local migrant workers, 1% international migrants
15	Access to food: Sources of carbohydrates (rice) and protein (meat, eggs, fish)	80% of carbohydrate sources (rice) are self-produced. 90% of protein sources are purchased from stalls and markets.	60% of rice is self-produced. 90% of protein sources are purchased from markets, stalls, and mobile vendors.

16	Energy access (electricity, oil, gas, and vehicle fuel)	Only 65% have direct access to electricity, and the rest are attached. 80% still use firewood. 40% of fuel access to gas stations, the rest to retailers.	85% access to electricity directly, the rest stuck. 60% use firewood, and 40% firewood and gas. 80% BBM access to mini gas stations.
17	Access to clean water: Drinking water and water for MCK)	Easy, because 80% of settlements are in valleys	It is relatively complicated in the dry season because 80% of settlements are on the ridge.

5.5. Gender Perspective in PAC Livelihood Recovery

Gender analysis is included because explicit and tacit strategies differ in giving space to men and women, both husbands, wives, sons, and daughters. Concerning economic recovery, the explicit strategy focuses more on the husband and wife as heads of the household. Meanwhile, the tacit strategy gives more space to the younger generation of PAC, both men, and women. Therefore, integrating the two strategies can strengthen the realization of the SDGs, related to faster economic growth and reducing social inequality and environmental degradation [28]–[31]. [32], [33] emphasized that collective, collaborative, and integrative models offer different *preferences.*

5.6. Constraint and Expectations for PAC Livelihood Recovery

Reconstructing PAC from a business dominated initially by rice farming to cultivating crops and businesses in various sectors takes work. More than financial and economic capital, human and social capital are needed. If measured from the development of PAC business empowerment, it is already at the *strengthening and advocation stage*. Assistants, institutions, and empowered actors until this stage faced technical and non-technical obstacles. The obstacles were such as the scattering of new PAC settlements (82 percent), the need for more professional human resources in business management (78 percent), PACs still focused on restoring their respective livelihoods (65 percent), and so on. In real terms, various tacit and explicit efforts have been made by all parties to maintain business continuity, but the Covid-19 Pandemic (2020-2021) destroyed everything

4. Discussion

4.1. PAC Livelihood Recovery Explicite Method

The synthesis was "the first phase is still enabling, related to the appropriateness of compensation and the effectiveness and efficiency of its utilization. The second phase is strengthening and advocating the PAC economy through strengthening entrepreneurial capacity (training, mentoring), strengthening business capital, strengthening business support services through infrastructure development (access to resources), and strengthening business institutions. The third phase is business innovation, and the fourth and fifth phases are the development of PAC business networks (improvement), business and market added value" [34]–[37]

4.2. PAC Livelihood Recovery Explicite Strategy

An explicit livelihood recovery strategy is interpreted as a formal effort made by external parties to initiate, strengthen, protect, innovate, and develop PAC. The concrete strategy included government social programs, institutional action plans, corporate social

responsibility, NGO empowerment programs, community service for higher education institutions, social action programs for research institutions, socio-economic media awareness, and innovation adoption from extension workers. The form is in the form of assistance (explicit method) and capital assistance. Capital assistance is realized through social, economic, natural, and human capital [38]. Some livelihood experts include political capital [39] and knowledge capital [40].

Explicitly, the PAC UCPS livelihood recovery strategy by the authorities has been outlined in the LARAP document. As the holder of authority, UIP -under the World Bank's supervision- had realized the rights of PAC. The rights were from compensation, relocation, and resettlement (natural capital) to recovery of livelihoods through the development of supporting infrastructure, economic capital assistance, strengthening human capital, establishing cooperatives and financial institutions, and micro (social capital). These actions were carried out in stages according to the needs level that the implementing team had mapped out since 2013. The recovery of the PAC's livelihood was carried out after resettlement, so it is more focused.

If we count until 2022, efforts to restore PAC livelihoods will take nine years. The process is complicated because PAC resettlement is not localized at one point. In real terms, relocation sites have been prepared and offered to PAC, but 71 percent of PAC prefer to move to their preferred location in the surrounding area, and 29 percent even moved to other sub-districts and regencies in West Java. For some PAC, the culture of field farming and other new businesses cannot immediately replace the loss of their old livelihoods and their productive resources, especially rice farming and paddy fields. Some PAC develops human rice to meet their food needs, while others persist in lowland rice farming by buying paddy fields in other areas.

In 2019, human capital capacity was strengthened through two approaches: First, developing the personal and family capacities of PAC, and Second, capacity building for PAC institutional managers, especially for PAC managers and PAC Cooperatives. The capacity-building activities vary, ranging from training, capital assistance, assistance from experts, counseling, comparative studies, etcetera (Table 1). In general, more activities were carried out at the upper dam and new road than at the lower dam. Capacity building is carried out by specialists, facilitators, consulting agents, and technical assistants. The strengthening of human capital has been carried out in the first phase (2010-2014), while the second phase (2015-2020) focuses on institutions (social capital).

PAC's human and social capital has been strengthened in all locations based on business interests and potential. However, it is still temporary and has a pilot group bias. The implication was that not all PAC households had the opportunity to participate in these activities. Informant E (52 years old, reference extension worker) emphasized: "The community needs ongoing assistance. Therefore, the basic framework must be expanded from just mapping interest to practice in the field so that PAC can be grouped based on their field and capacity conditions, which needs to be initiated, strengthened, protected, innovated, developed, and engineered. With that, assistance will be more effective and efficient."

As a new economic institution that is an explicit strategy product, ideally, PAC cooperatives can accelerate the recovery of PAC livelihoods. Cooperative A, which has 283 household members and a capital of Rp. 2.1 billion, Cooperative B has 200 families and a capital of Rp. 1.5 billion, have only been able to roll out 30 percent of their business capital in savings and loans. Cooperative C with 194 households and capital of Rp. 1.4 billion has only been able to roll out 35 percent of its capital in savings and loans, necessities, and animal feed distribution. Cooperative C is relatively livelier because it has a professional chairman. [41] emphasized that quality human capital, social capital, natural capital, and financial capital are enough to restore livelihoods.

Informant G (52 years old, MSME office representative) said, "Cooperative C is more developed than Cooperatives A and B because an experienced MSME business consultant led it." Business consultant confirms that human capital assistance ranks first in livelihood

recovery [41]. Since 2017, cooperative C has owned various businesses and operational vehicles. However, the Covid-19 Pandemic killed all of that in 2020-2022. The implication is that the cooperative suffers losses, and the chairman resigns. Now Cooperative C has to start a business from scratch with new management who are very careful in managing business capital.

According to Informant D (46 years old, reference NGOs), PAC cooperatives are challenging to develop because " The management needs to be more professional. No one has experience managing cooperatives. Assistance has existed, but temporary. Efforts to increase the capacity of PAC management and PAC cooperatives have been carried out through training and visits to cooperatives. However, they have not had much impact because prospective managers and administrators have not had apprenticeships. Ideally, as a process, strengthening social capital flows from the enabling, strengthening, advocation, innovation, and improvement stages [42]–[45].

Livelihood recovery carried out by external parties (explicit) is biased towards jobs and general businesses, such as farming, livestock business, and agriculture-based MSMEs. The implication is that the PAC group of young men and women needs to be accommodated, even though they occupy a dominant position (38 percent) in the rural demographic structure [46]. In real terms, the assistance provided during the 2014-2020 period has successfully restored the livelihoods of PAC engaged in the agro-complex sector. These conditions have encouraged PAC groups not engaged in the agricultural sector to implement tacit strategies to restore their livelihoods through adaptation, creation, coping, or mitigation. Some of the actions were carried out individually or collectively [47]

4.3. PAC Livelihood Recovery Tacit Strategy

The tacit strategy for restoring the PAC's livelihood is interpreted as the efforts made by the internal PAC, both personally and communally, to restore their livelihood. The concrete strategies are in the form of initiatives, adaptation, coping, and mitigation [38], [48]–[52] and empowering [53]. Livelihoods are grown in the PAC ecosystem through diversification, differentiation, intensification, and substitution patterns. The nature of the tacit strategy approach is internalization, which is rooted in and extends to external networks. The practice prioritizes initiative, mutual trust, sharing, collaborating, and involving all parties (participatory combination).

Tacit strategies are created and innovated by PAC families and communities through sharing and collaborating mechanisms, both in physical and virtual communities. Critical dialogue is also carried out within family, community, and village business networks. The motor is PAC, who is young, educated, skilled, and well-networked. So far, they have yet to be accommodated in an explicit strategy. They are the ones who initiate the formation of social dialogue space in social media. They bridge and bond between PAC living in rural areas and villagers living in urban areas and abroad. The tacit strategy is carried out simultaneously with the implementation of the explicit strategy (Figure 2), both offline and online so that physical distance and social distance are not limited. Ideas, experience, capital, networks, and new business opportunities grow through an integrated space for sharing and collaborating.

As a result, if the explicit strategy only grows 11 PAC livelihoods, then with the tacit and explicit integration, 26 types of new businesses will grow (155 percent). If the explicit strategy is biased towards the agricultural, livestock, fishery, forestry, and MSME sectors, then the tacit strategy involves many sectors. In general, three sectors are the focus of the tacit strategy. First, the trade sector that grows rice stalls, basic food stalls, mobile traders, collectors and commodity dealers, grocery stores, building materials stores, electronics shops, book and stationery shops, photocopiers, cellphone counters, credit/quota distributors, gas distributors, distributors BBM, seed distributors, and others.

Second, the transportation and communication sector grew the business of village public transportation, goods transportation, delivery services, motorcycle taxis, drivers, etcetera. Third, the industrial sector that grows convection, rice milling, sawmills, vehicle

repair shops, wood and furniture processing, bamboo processing, sand mining, factory workers, banana chips home industry, palm sugar home industry, woven bamboo home industry, honey bee business, seed-based community, and others. The agricultural industry was also developed, such as the packaging of black rice and red rice and the processing of spice plants. Tourism has been discussed but has yet to be developed.

The results of field observations confirm that the lives and livelihoods of PAC are now better and more diverse than before. After the implementation of the compensation and the improved access of PAC to various productive resources, many entrepreneurial activities were born at the project site and new settlement locations. PAC does not only create jobs and new entrepreneurs for PAC but also for non-PAC residents. In fact, with the opening of new roads and improved village roads at the project site, the livelihoods of PAC and residents, generally, have become more expansive, including from outside the rural area.

Spatially, most (66.10 percent) of the PAC in the upper dam work in the non-agricultural sector, as well as those in the lower dam (64.71 percent) and on new roads (71.05 percent). Generally, they switch from agriculture to craftsmen (convection), small-scale agro-industry, private employees, construction workers, traders, drivers, services, etcetera. Some (2 percent) are still migrant workers in the Middle East. There is also, about three percent of PAC are civil servants. Since transportation access has improved, the livelihoods of PAC have become very diverse. The potential for creating new livelihoods is still open, even though the level of competition with newcomers is getting higher.

Informant E (a 33-year-old youth leader) revealed, "compared to other new businesses, seed, and furniture are the most prospective. Besides being supported by biological resources from community forests and agroforestry, market demand is also increasing. Wood from the community forest is processed into building materials and made into handicrafts, couches, tables, chairs, bookshelves, furniture shelves, and others. The market for handcrafted wood is relatively easy in secondary preparations (poles, boards, rafters) are also accommodated by building and furniture shops. Meanwhile, partners in urban areas accommodate tertiary and quarter preparations (furniture, furniture).

Entrepreneurs trading, transportation, carpentry, and stalls are the most dominant, in addition to processing agricultural and forestry products. Suppose the business assistance to increase the added value of local-specific commodities is carried out sustainably, and the PAC capital assistance managed by the PAC Cooperative is productive. In that case, more new livelihoods will be created for the PAC and their generation. If the construction of public facilities, including roads, bridges, irrigation, information networks, education, and health services, is realized in all locations, a wider new livelihood will be created. Encouraging some PAC to seek livelihood outside the UCPS area.

In fact, after improving access to roads and transportation, around 15.60 percent of PAC migrated to cities and abroad, especially young people. On the positive side, PAC livelihoods are becoming more numerous and varied. There are couriers, drivers, household assistants (ART), entrepreneurs, traders, laborers, private employees, and even migrant workers. As a result, the income of PAC has improved, and the number of PAC generations who have graduated from high school and tertiary institutions has increased. Being a TKI was seen as promising but starting to be abandoned because the wages value is equivalent to entrepreneurship. Therefore, working and doing business in the country is an option.

Informant W (50 years old, university representative) emphasized that "infrastructure development has increased PAC's access to markets, land, roads, transportation (transportation), information, terminals, surrounding villages and to cities. PAC's access to markets for agricultural, livestock, and forestry products has increased significantly. If PAC previously sold its products to middlemen, now they can directly access strategic markets in the provincial capital and its surroundings. The farming community does not only sell fresh but also processed products. However, improved roads and transportation have also increased the flow of people and natural resources out of the countryside (capital drain).

Improved transportation infrastructure has facilitated the mobility of PAC and rural communities to urban areas, thus attracting investors, business people, traders, distributors,

and others to come, transact and invest in the project area. Thus, new business clusters include minimarkets, gas stations, LPG agents, building materials agents, etcetera. Informant W (50 years old, village government reference) emphasized that when access to productive resources improves, new job and business opportunities are created. The livelihoods of PAC and the community, in general, are becoming more open. The problem is that these new livelihood opportunities are not anticipated in the explicit strategy but appear in the tacit strategy.

One thing that must be considered in measuring the development of PAC livelihoods is that the expected livelihoods are sustainable. The development of PAC's livelihoods is explicitly biased towards a short-term approach, while the long-term livelihoods of its generation should be given more attention. In addition, the recovery of PAC livelihoods is also very, very biased by farming which depends on the rainy season. PAC requires alternative businesses that are anticipatory against the risk of loss of livelihood in the dry season, including loss of food sources, especially rice.

In real terms, opportunities to create new livelihoods to grow with a tacit strategy are still wide open, both in the tourism, creative economy, logistics, and agro-industry sectors. Strengthening PAC's access to business networks and productive resources, especially transportation, markets, finance, health, education, information, production inputs, and energy, allows collaboration with ABCGM to be created. If, by 2022 alone, 81 percent of new PAC entrepreneurs have grown from the tacit strategy, then if it is integrated with the explicit strategy, it can grow even higher. Suppose initially entrepreneurship was dominated by the production of agricultural commodities (40 percent), essential food services (32 percent), and trading businesses (22 percent), then in the future. In that case, it will develop into businesses to increase added value, logistics services, agro-ecotourism, tourism villages, crafts, online services, etcetera.

4.4. Impact of Explicit and Tacit Integration Strategy for PAC Livelihood Recovery

In general, most of the PACs' jobs before the project were rice farmers, crop farmers, forestry land cultivators, agricultural laborers, and traders of agricultural products. After the project started, the number of crop farmers increased, while rice farmers decreased by 40 percent and forest cultivators decreased by 50 percent. The number of land-owning farmers increased from 41 percent to 63.90 percent. Meanwhile, cultivators fell from 13.70 percent to 8.4 percent ($p<0.05$). Sharecroppers and farm laborers declined because they switched to non-agricultural jobs. At the beginning of the project, the number of farmers decreased but increased again after the recovery program.

After compensation was realized in 2012-2016, the PAC income level per capita per month increased by 71.33 percent, while around 28.67 percent tends to be constant and decrease ($p<0.05$). The highest increase was felt by 84.75 percent of PAC living in the upper reservoir, while a significant decrease was experienced by 35.09 percent of PAC along the new road and lower dam. In general, landowners and cultivators in all locations experienced an increase in income per capita per month. If before UCPS, around 88.24 percent of PAC income was less than 2.5 million/capita/month, then after that, it decreased by around 52.33 percent ($p<0.05$).

In 2017-2019, the number of PACs with more than 2.5 million revenues continued to increase. There are five additional sources of income earned by PAC: First, additional business capital from family members who work in urban areas, whether to open stalls, repair shops, gas distributors, or retail motor vehicle fuel. Second, being a construction worker for quite a long time. Third, additional income from the wife, who opens a stall, and from the son, who works as a motorcycle taxi driver, transportation driver, and a convection business. Fourth, additional income from the wife's business processes food, wood, and bamboo into various crafts.

In general, the income of PAC who own land has increased in the 2012-2022 period due to receiving compensation, increased land prices, or increased prices for agricultural

production. In contrast, the decline occurred in the farmers cultivating the land at the lower dam because they lost their cultivated land and did not receive much compensation money. However, in 2019 they were permitted to work on Perhutani land in a new location, so their income increased again. Strictly speaking, the livelihood of PAC has improved after compensation, resettlement, and transportation have improved, and they are open to the outside world.

If before UCPS the income of the WTP came from livelihoods as farmers, cultivators, farm laborers, middlemen, and laborers transporting agricultural products, now it is more diverse. If previously PAP households received more income from husbands, now it comes from wives and working-age household members. If previously 88.24 percent of PAP households had an income of less than 2.5 million/month, now 53 percent have more than the regional minimum wage (Rp 3.2 million/month). The increase occurred due to additional income from all family members working in the non-agricultural sector ($p<0.05$).

Techno-economically, the existence of UCPS offers many job and business opportunities. The knowledge and skills of PAC are much richer than before (78.38 percent). PAC access to business capital, working capital, natural capital (land, seeds, seedlings), technology capital, and information capital is much higher (82.25 percent). However, PAC's social capital is still in the weak category (43 percent), including its trusting relationship with outsiders who enter the area. Business and work opportunities for PAC are still wide open, but they have yet to be realized (Table 1).

Specifically, the impact of the explicit method on the livelihood recovery of PAC is still tiny (36.11 percent). Regardless, these efforts have created many new livelihoods, both on-farm sub-systems (such as agriculture, animal husbandry, fisheries, and forestry), of-farm (such as sawmills, wood or furniture crafts, banana processing, palm sugar processing), and non-farm. -farm (such as stalls, workshops, fuel retailers, transportation, trading). However, the explicit method also has negative impacts on PAC behavior, such as dependence on capital assistance (25 percent), consumptive behavior in utilizing capital assistance (25 percent), and negative perceptions of cooperative managers and assistants (50 percent). [54] reviewed 203 case studies related to the explicit method, revealing that only physical impacts improved, while natural, social, financial, human, and cultural capital impacts suffered severely.

Informant G (49 years, reference of NGOs) revealed*: "there are several the negative impact of explicit strategies on PAC behavior, such as dependence on cash or in-kind assistance, wanting to get instant capital assistance, viewing the rigid mechanisms applied by groups and cooperatives, being reluctant to learn how to make business plans, spending venture capital assistance on things unproductive and so on." The behavior of the assistants who did not follow the SOP also emerged. All of this has fueled the growth of mutual suspicion, distrust, and negative perceptions of some PACs towards MFI management and cooperatives if it creates conflict, members' accusations, and jealousy of cooperative managers and PACs who have succeeded in developing productive economic throughout entrepreneurship.*

The lack of an explicit strategy has increased the adaptability of the PAC community to create new livelihoods from various opportunities and limitations that come from outside. Strictly speaking, limitations have fostered community creativity and innovation in creating new sources of income and business fields, strengthening the access of PAC to various productive resources, such as basic food needs, raw materials, markets, information, transportation, and capital. Then fostering a planned business culture (such as preparing business plans and drafting business proposals), building a collective business culture (sharing, collaborating, cooperating), etcetera. There are new jobs that grow as derivatives (differentiations) from previous jobs and businesses, and there are ones that are entirely new as a result of diversification and innovation [55]–[57]

4.5. *Gender Perspective in PAC Livelihood Recovery*

In real terms, the recovery of PAC livelihoods is explicitly carried out on groups of men and women. If the male group carries out the agro-complex business, the female group carries the banana chip, palm sugar, and woven bamboo crafts. Women's participation is high in food processing and packaging business training. Participation is high (84 percent) because it follows their interests. However, their participation is still biased toward production, not marketing yet. High participation is also biased towards the older age group (90 percent), while it still needs to be clarified for the young. There is no specific, explicit strategy for young PAC, both men, and women. This strategy also encourages young PAC groups to create and innovate tacit strategies.

The participation of men is dominant in agriculture, animal husbandry, fishery, and forestry (85 percent). Apart from the four according to interest, it has also become a culture. Therefore, the explicit strategy becomes agro-complex bias. Huma rice, peanuts, bananas, and corn are the primary agricultural commodities besides chicken and sheep farming. Apart from wood, cardamom, and galangal, sugar palm and honey bees are mainstays in the forestry sector. For strengthening agricultural businesses, pumping assistance is part of an explicit strategy to anticipate drought in the dry season. The others were assistance with ten tractor units, agricultural product processing machines, and packaging and marketing equipment for agricultural products.

Technically, the mentoring method is mainly done for the male PAC group because the number and types of businesses are varied and complex. [38] confirmed that strengthening PAC economic capital in an explicit strategy is always dominant in agriculture, livestock, fisheries, and forestry. Even though the assistance to the female PAC group was less, it was intensive and focused on food processing crafts. The involvement of female PAC has been carried out, but production bias has yet to reach marketing and institutional management. Participation in cooperative management exists but still needs to be improved. Assistance is also carried out by related technical offices, but still biased towards agro complex and male groups. 68 percent of rural sector work is done by women (Setiawan, 2005; Qanti et al., 2021).

Informant A (55 years old, female representing as an PAC administrator and PAC cooperative) stated: "Actually, the opportunities for PAC men and women to be involved in managing rural economic institutions are very open, except for those young and residence has moved to another area." However, PAC's participation in business training and mentoring could have been improved, as both were only given to pilot groups. Complete assistance has yet to be carried out because restrictions hamper it due to the Covid-19 Pandemic. The implication is that many PAC men and women do not know about the explicit strategy". The livelihoods of rural communities cannot be generalized because they are interrelated [55], [58], [59].

In fact, the participation of PAC women in activities agriculture is still relatively high (51 percent), while in the sector very low non- agriculture (13 percent). Thirty-five percent of women are the owners of agricultural land. However, women are only a little involved in the explicit strategy. Women are more accommodated in the tacit strategy, characterized by their dominant role in the business of rice stalls, children's snack stalls, basic food stalls, traveling vendors, convection, etcetera. All the changed composition of breadwinners in the household, from initially dominated by men to be equity with women. In addition, women also play a role in the craft business of food, bamboo woven crafts, village officials, boarding school administrators, retail fuel services, etcetera.

All of this confirms that the integration of explicit and tacit strategies has increased and expanded the role of women, from previously dominant in the agricultural, livestock, and forestry sectors to livelihoods in the non-agricultural sector as farmers. Informant L (46 years old, DMU consultant reference) revealed, " in the 2013 LARAP stated that before UCPS was implemented, 51 percent of PAC women were farmers, both owners (35

percent), cultivators and farm laborers (11 percent). Of the 49 percent of PAC women who do not work in the agricultural sector, around 87 percent are only homemakers, 11 percent manage stalls, and the rest are food craftsmen, village officials, buying and selling, and civil servants. However, after access to roads and transportation improved, the role of PAC women increased in number and type. Trade is the favorite business of women, then itinerant traders, food, and sewing artisans.

4.6. Constraint and Expectations for PAC Livelihood Recovery

Socio-economically, the obstacle to restoring livelihoods was dominant, sourced from the internal environment of the PAC. First, economic disorientation and distrust have made more than half of PAC (50.63 percent) demand that business capital be distributed. Second, PAC had yet to have a formal organizational culture, so they always wanted instant capital in applying for venture capital to the PAC Cooperative (86 percent). Third, because there is a motive and disorientation in applying for funds, the management of the PAC Cooperative is tightening the distribution of working capital. 21.52 percent of PAC still want cooperatives to improve and continue; 20 percent want better cooperative services; 12 percent want cooperatives to play a role in marketing. Meanwhile, 6 percent want to develop members' businesses, and 2.5 percent want the equally distributed distribution of the remaining business results. The multifunctional, multi-business, and multi-purpose nature of a cooperative in rural areas is social capital [60]–[62].

In real terms, PAC expects that training and mentoring will be carried out for all areas of agro-complex-based rural businesses (agriculture, animal husbandry, fisheries, plantations, and forestry) and non-agro complexes. Training, mentoring, and capital assistance are carried out in the production business sub-system (on-farm) and the off-farm sub-system (both farming input services, product processing, and marketing of business products). For the majority of PACs with low education, preparing a business plan is a challenging job. Therefore, training and mentoring should be focused on group administrators and educated young PACs. Strictly speaking, PAC needs business capital assistance, but it needs human capital that is adaptive to formal mechanisms.

The results of the FGD formulated " *new livelihood opportunities for growth are still open, both from the agro-complex sector, trade, and transportation, as well as the education sector, ecotourism, agrotourism, creative economy, logistics services, energy services, clean water services, community-based agro-industry, community-based seeding, etcetera. Tacit and explicit strategy collaboration must be increased in strengthening natural capital, economic capital, financial capital, social capital, and human capital. Weir mitigation must be internalized and institutionalized so that settlement designs, infrastructure, and economic activities do not harm the weir ecosystem. Livelihoods must continue to be created and innovated, but the feedback is favorable to the dam ecosystem. Call it agroforestry, organic and inorganic waste processing, and community-based seed breeding for sustainable greening in all conservation zones*.

5. Conclusions

We examined explicit and tacit strategies for partially integrated PAC livelihood recovery through surveys, in-depth interviews, and FGDs. Recovery by integrating explicit and tacit strategies is more capable of restoring PAC livelihoods than partial strategies. We used outcome mapping and different tests to survey direct and tacit strategy input, process, output, and outcome data from 325 families (975 individuals) of PAC UCPS. First, direct strategy inputs are in the form of economic capital, physical capital, and human capital (facilitators). In contrast, tacit strategies include social capital, natural capital, information capital, and human capital (collaborators).

The exact strategy process begins with interest mapping, training, facilitating the formation of MFIs and PAC cooperatives, capital assistance, and facilitation of access to marketing networks. Meanwhile, the tacit process begins with the initiation of educated and skilled PAC youth in villages and overseas to carry out resilience, adaptation, coping, and

mitigation through critical dialogue and collaboration in autonomous physical and virtual spaces, significantly developing the PAC generation. Concretely, enabling, strengthening, advocation, and innovation of new businesses, added value for only local commodities, marketing through applications, capital coping, and risk mitigation.

Explicit strategy recovered 11 types of PAC livelihoods, the tacit strategy 15 types of livelihoods, and the integration of the two into 26 types of livelihoods. The integrated strategy collaborates initiatives, creation, adaptation, coping, mitigation, and innovation internalized from the PAC ecosystem with interventions and innovations in the form of policies, programs, and assistance introduced from the external PAC environment. However, it takes work to integrate participants, volunteers, and collaborators from the tacit strategy with facilitators, facilitators, and consulting agents from the explicit strategy. The autonomous village's physical and virtual critical dialogue spaces can bridge and bind the two.

Suppose the explicit strategy uses educated, skilled, and contracted professional assistants to facilitate and introduce innovations for restoring PAC livelihoods within a particular time. In that case, the tacit strategy uses young collaborators who care, are educated, talented, skilled, have a leadership spirit, and are experienced entrepreneurs voluntarily from space local, both in rural and overseas positions. Based on their awareness, they share and collaborate physically and virtually, whenever and wherever agreed. If economics and technology are the main assets of an explicit strategy, then a tacit strategy focuses more on social, cultural, and ecological capital.

These results have implications for the survey design and action plan for PAC pumped storage livelihood recovery conducted by UIP, the government, academics, and NGOs. Strictly speaking, if the target of the explicit strategy is biased towards men and women as heads of households, then complement it with a tacit strategy that targets more youth, women, and PAC children. The integration strategy collaborates intervention and innovation (supply-driven) from the external environment with initiatives, participation, and adaptation (demand-driven) from the PAC environment. Integration is more than collaborative, but with an insight into gender justice and growing self-sufficiency, the main prerequisite for realizing sustainable livelihood recovery.

Some limitations to the research results are essential to keep in mind. First, the nature of the mixed method research is not supported by data analysis with inferential statistics in the quantitative design for the explicit strategy and strong dialectics in the qualitative method for the tacit strategy that uses the citizenship method approach, so the conclusions are not robust. Second, the integration of explicit and tacit strategies for livelihood biases that have already grown, while aspects of livelihood sustainability, including new livelihood potentials and opportunities, still need to be mapped. Third, opening PAC access can trigger brain drain and brain capital. All of these points need further research on the issue of restoring the livelihoods of PAC and their generation.

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