

PROTEKSI ISI LAPORAN KEMAJUAN PENELITIAN

Dilarang menyalin, menyimpan, memperbanyak sebagian atau seluruh isi laporan ini dalam bentuk apapun kecuali oleh peneliti dan pengelola administrasi penelitian

LAPORAN KEMAJUAN PENELITIAN MULTI TAHUN

ID Proposal: ba5f662c-6838-4713-914d-e8408c5aea89
Laporan Kemajuan Penelitian: tahun ke-1 dari 2 tahun

1. IDENTITAS PENELITIAN

A. JUDUL PENELITIAN

EKSPLORASI TINGKAT EFISIENSI DAN DAYA SAING KEMITRAAN AYAM PEDAGING DALAM UPAYA PENGEMBANGAN AGRIBISNIS PERUNGGANAN BERBASIS BIAYA SUMBERDAYA DOMESTIK DI PROVINSI SULAWESI UTARA

B. BIDANG, TEMA, TOPIK, DAN RUMPUN BIDANG ILMU

Bidang Fokus RIRN / Bidang Unggulan Perguruan Tinggi	Tema	Topik (jika ada)	Rumpun Bidang Ilmu
Ketahanan Pangan	-	Ketersediaan pangan berbasis ketahanan dan kemandirian pangan	Sosial Ekonomi Perternakan

C. KATEGORI, SKEMA, SBK, TARGET TKT DAN LAMA PENELITIAN

Kategori (Kompetitif Nasional/ Desentralisasi/ Penugasan)	Skema Penelitian	Strata (Dasar/ Terapan/ Pengembangan)	SBK (Dasar, Terapan, Pengembangan)	Target Akhir TKT	Lama Penelitian (Tahun)
Penelitian Desentralisasi	Penelitian Dasar Unggulan Perguruan Tinggi	SBK Riset Dasar	SBK Riset Dasar	3	2

2. IDENTITAS PENGUSUL

Nama, Peran	Perguruan Tinggi/ Institusi	Program Studi/ Bagian	Bidang Tugas	ID Sinta	H-Index
ERWIN WANTASEN Ketua Pengusul	Universitas Sam Ratulangi	Peternakan		6009199	1
Dr SINTYA J K UMBOH S.Pt, M.Si Anggota Pengusul 1	Universitas Sam Ratulangi	Peternakan		6033763	0

3. MITRA KERJASAMA PENELITIAN (JIKA ADA)

Pelaksanaan penelitian dapat melibatkan mitra kerjasama, yaitu mitra kerjasama dalam melaksanakan penelitian, mitra sebagai calon pengguna hasil penelitian, atau mitra investor

Mitra	Nama Mitra
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4. LUARAN DAN TARGET CAPAIAN

Luaran Wajib

Tahun Luaran	Jenis Luaran	Status target capaian (<i>accepted, published, terdaftar atau granted, atau status lainnya</i>)	Keterangan (<i>url dan nama jurnal, penerbit, url paten, keterangan sejenis lainnya</i>)
1	Publikasi Ilmiah Jurnal Internasional	accepted/published	

Luaran Tambahan

Tahun Luaran	Jenis Luaran	Status target capaian (<i>accepted, published, terdaftar atau granted, atau status lainnya</i>)	Keterangan (<i>url dan nama jurnal, penerbit, url paten, keterangan sejenis lainnya</i>)
1	Prosiding dalam pertemuan ilmiah Nasional	sudah terbit/sudah dilaksanakan	
1	Hak Cipta	terdaftar	

5. ANGGARAN

Rencana anggaran biaya penelitian mengacu pada PMK yang berlaku dengan besaran minimum dan maksimum sebagaimana diatur pada buku Panduan Penelitian dan Pengabdian kepada Masyarakat Edisi 12.

Total RAB 2 Tahun Rp. 155,025,000

Tahun 1 Total Rp. 71,147,500

Jenis Pembelanjaan	Item	Satuan	Vol.	Biaya Satuan	Total
Analisis Data	Biaya analisis sampel	Unit	100	100,000	10,000,000
Bahan	ATK	Paket	1	500,000	500,000
Bahan	Barang Persediaan	Unit	10	232,550	2,325,500
Bahan	Bahan Penelitian (Habis Pakai)	Unit	200	9,350	1,870,000
Pelaporan, Luaran Wajib, dan Luaran Tambahan	Biaya seminar nasional	Paket	1	5,000,000	5,000,000
Pelaporan, Luaran Wajib, dan Luaran Tambahan	Publikasi artikel di Jurnal Internasional	Paket	1	10,000,000	10,000,000
Pelaporan, Luaran Wajib, dan Luaran Tambahan	Luaran KI (paten, hak cipta dll)	Paket	1	3,000,000	3,000,000
Pelaporan, Luaran Wajib, dan Luaran Tambahan	Biaya konsumsi rapat	OH	25	100,000	2,500,000
Pengumpulan Data	HR Sekretariat/Administrasi Peneliti	OB	4	163,000	652,000
Pengumpulan Data	HR Petugas Survei	OH/OR	38	100,000	3,800,000
Pengumpulan Data	Penginapan	OH	40	100,000	4,000,000
Pengumpulan Data	Biaya konsumsi	OH	40	150,000	6,000,000

Jenis Pembelanjaan	Item	Satuan	Vol.	Biaya Satuan	Total
Pengumpulan Data	Transport	OK (kali)	43	500,000	21,500,000

Tahun 2 Total Rp. 83,877,500

Jenis Pembelanjaan	Item	Satuan	Vol.	Biaya Satuan	Total
Analisis Data	Biaya konsumsi rapat	OH	25	100,000	2,500,000
Analisis Data	Biaya analisis sampel	Unit	93	100,000	9,300,000
Bahan	ATK	Paket	1	500,000	500,000
Bahan	Barang Persediaan	Unit	100	10,000	1,000,000
Bahan	Bahan Penelitian (Habis Pakai)	Unit	200	11,850	2,370,000
Pelaporan, Luaran Wajib, dan Luaran Tambahan	Biaya seminar nasional	Paket	1	10,000,000	10,000,000
Pelaporan, Luaran Wajib, dan Luaran Tambahan	Publikasi artikel di Jurnal Internasional	Paket	1	15,000,000	15,000,000
Pelaporan, Luaran Wajib, dan Luaran Tambahan	Luaran KI (paten, hak cipta dll)	Paket	1	2,500,000	2,500,000
Pelaporan, Luaran Wajib, dan Luaran Tambahan	Biaya konsumsi rapat	OH	25	100,000	2,500,000
Pengumpulan Data	HR Sekretariat/Administrasi Peneliti	OB	4	163,125	652,500
Pengumpulan Data	HR Petugas Survei	OH/OR	40	82,500	3,300,000
Pengumpulan Data	Penginapan	OH	40	100,000	4,000,000
Pengumpulan Data	Biaya konsumsi	OH	40	100,000	4,000,000
Pengumpulan Data	Transport	OK (kali)	50	525,100	26,255,000

6. KEMAJUAN PENELITIAN

A. RINGKASAN: Tuliskan secara ringkas latar belakang penelitian, tujuan dan tahapan metode penelitian, luaran yang ditargetkan, serta uraian TKT penelitian.

Tujuan dari penelitian ini adalah Menganalisis tingkat efisiensi finansial, efisiensi ekonomi, keunggulan kompetitif dan komparatif (daya saing) kemitraan ayam pedaging di Provinsi Sulawesi Utara secara statis dan dinamis berbasis biaya sumberdaya domestik dalam upaya meningkatkan produksi dan konsumsi pangan hewani melalui pengembangan agribisnis perunggasan di Sulawesi Utara. Pengukuran tingkat efisiensi dan daya saing agribisnis kemitraan ayam pedaging menggunakan metode analisis PAM (Policy Analysis Matrix) dan analisis sensitivitas. Lokasi penelitian dipilih secara purposive yaitu Kabupaten Minahasa Utara dan Kabupaten Minahasa dengan populasi ternak ayam pedaging terbesar dan merupakan sentra produksi ayam pedaging di Sulawesi Utara.. Penelitian ini menggunakan dua tahapan penelitian yaitu pada tahun pertama melakukan identifikasi karakteristik peternak, perusahaan mitra dan pedagang/pemotong, melakukan analisis statis dengan PAM (Polycy analysis matrix) meliputi identifikasi terhadap berbagai input (tradable dan domestik) dan output usaha kemitraan ayam pedaging, analisis efisiensi, analisis daya

saing, dan analisis distorsi kebijakan dan kegagalan pasar serta dampaknya terhadap output dan input (tradable dan domestik). Tahapan selanjutnya pada tahun kedua adalah melakukan analisis sensitivitas (dinamis) secara parsial dari masing - masing dari faktor harga pakan, harga daging ayam dan nilai tukar rupiah serta berbagai kombinasi ketiga faktor tersebut secara simultan terhadap tingkat efisiensi dan daya saing kemitraan ayam pedaging di Sulawesi Utara. Penelitian menggunakan metode survey untuk memperoleh dan mengumpulkan informasi dari 58 sampel responden di Kabupaten Minahasa Utara yang terdiri atas 53 peternak , 3 perusahaan mitra dan 2 pedagang besar yang dipilih secara acak dari 352 peternak ayam pedaging, 6 perusahaan mitra dan 4 pedagang besar/pemotong. Informasi penelitian juga akan diperoleh dari sampel responden di Kabupaten Minahasa yang terdiri atas 34 peternak, 3 perusahaan mitra dan 2 pedagang besar yang dipilih secara acak dari 224 peternak ayam pedaging, 3 perusahaan mitra dan 4 pedagang /pemotong besar. Pada tahun pertama akan dilakukan identifikasi karakteristik dari peternak mitra, perusahaan mitra serta pedagang besar, penentuan tingkat efisiensi dan daya saing kemitraan ayam pedaging dengan metode Policy Analysis Matrix (PAM). Pada tahun kedua akan dilanjutkan dengan penentuan tingkat efisiensi dan daya saing kemitraan ayam pedaging melalui analisis sensitivitas karena metode analisis PAM yang dilakukan pada tahun pertama masih bersifat statis. Luaran yang ditargetkan setiap tahun berupa publikasi di Jurnal internasional dan publikasi dalam prosiding internasional. Tingkat kesiapterapan teknologi (TKT) penelitian ini selama 2 tahun antara 2-3. Hasil penelitian tahun pertama bahwa kemitraan ayam pedaging di Provinsi Sulawesi Utara merupakan usaha yang efisien dari sisi finansial maupun ekonomi. Profitabilitas skala usaha ≤ 5000 ekor lebih rendah dari pada skala usaha > 5000 ekor karena perbedaan faktor ekonomis dan teknis. Profitabilitas privat yang lebih rendah daripada profitabilitas social menunjukkan bahwa kemitraan ayam pedaging di Poivinsi Sulut menanggung harga input yang lebih mahal dan harga output yang lebih murah daripada harga sosialnya. Hal ini berarti kemitraan ayam pedaging di Sulut belum mendapat insentif dari kebijakan pemerintah. Kemitraan ayam pedaging memiliki daya keunggulan kompetitif dan komparatif yang ditunjukkan masing masing oleh nilai PCR sebesar 0,94-0,97 dan DRGR sebesar 0,80-0,83. Hal ini berarti bahwa untuk mendapatkan nilai tambah atau menghemat satu satuan devisa dalam memproduksi daging ayam memerlukan biaya sumberdaya domestik sebesar 0,94-0,97 US\$ pada harga privat dan 0,80-0,83 US\$ pada harga social. Luaran diperoleh berupa publikasi di journal Business Management dan pemakalah pada seminar internasional ICVHE 2019.

B. KATA KUNCI: Tuliskan maksimal 5 kata kunci.

Efisiensi; daya saing; kemitraan ayam pedaging; Policy Analysis Matrix; analisis sensitivitas

Pengisian poin C sampai dengan poin H mengikuti template berikut dan tidak dibatasi jumlah kata atau halaman namun disarankan seringkasan mungkin. Dilarang menghapus/memodifikasi template ataupun menghapus penjelasan di setiap poin.

C. HASIL PELAKSANAAN PENELITIAN: Tuliskan secara ringkas hasil pelaksanaan penelitian yang telah dicapai sesuai tahun pelaksanaan penelitian. Penyajian dapat berupa data, hasil analisis, dan capaian luaran (wajib dan atau tambahan). Seluruh hasil atau capaian yang dilaporkan harus berkaitan dengan tahapan pelaksanaan penelitian sebagaimana direncanakan pada proposal. Penyajian data dapat berupa gambar, tabel, grafik, dan sejenisnya, serta analisis didukung dengan sumber pustaka primer yang relevan dan terkini.

Pengisian poin C sampai dengan poin H mengikuti template berikut dan tidak dibatasi jumlah kata atau halaman namun disarankan ringkas mungkin. Dilarang menghapus/memodifikasi template ataupun menghapus penjelasan di setiap poin.

C. HASIL PELAKSANAAN PENELITIAN: Tuliskan secara ringkas hasil pelaksanaan penelitian yang telah dicapai sesuai tahun pelaksanaan penelitian. Penyajian meliputi data, hasil analisis, dan capaian luaran (wajib dan atau tambahan). Seluruh hasil atau capaian yang dilaporkan harus berkaitan dengan tahapan pelaksanaan penelitian sebagaimana direncanakan pada proposal. Penyajian data dapat berupa gambar, tabel, grafik, dan sejenisnya, serta analisis didukung dengan sumber pustaka primer yang relevan dan terkini.

Gambaran Umum Wilayah Penelitian

Kabupaten Minahasa Utara

Secara astronomis, Minahasa Utara terletak antara 1018'30" - 1°53'00" Lintang Utara dan antara 124°44'00" - 125°11'00" Bujur Timur. Berdasarkan posisi geografisnya, Kabupaten Minahasa Utara memiliki batas-batas: Utara – Kab. Kepulauan Sitaro, Laut Sulawesi, dan Laut Maluku; Selatan – Kabupaten Minahasa; Barat – Kota Manado; Timur – Kota Bitung. Kabupaten Minahasa Utara memiliki 10 Kecamatan yaitu Kecamatan Kema, Kecamatan Kauditan, Kecamatan Airmadidi - Kecamatan Kalawat, Kecamatan Dimembe, Kecamatan Talawaan, Kecamatan Wori, Kecamatan Likupang Barat, Kecamatan Likupang Timur, Kecamatan Likupang Selatan

Minahasa utara memiliki ketinggian rata-rata + 188,3 meter di atas permukaan laut, terletak pada 1°18'30" - 1°53'00" Lintang Utara, serta 124°44'00" - 125°11'00" Bujur Timur. Luas wilayah Minahasa utara adalah 1.059,24 km². Akhir tahun 2018, wilayah administrasi Kabupaten Minahasa utara terdiri dari 10 wilayah kecamatan, luas masing-masing kecamatan, yaitu: Kema (78,76 km²), Kauditan (108,20 km²), Airmadidi (86,66 km²), Kalawat (39,03 km²), Dimembe (166,43 km²), Talawaan (82,51 km²), Wori (90,70 km²), Likupang Barat (104,29 km²), Likupang Timur (290,84 km²), serta Likupang Selatan (11,82 km²). Kondisi topografis Kabupaten Minahasa Utara sebagian besar merupakan dataran rendah yang terdapat gunung tertinggi Di Sulawesi Utara yaitu Gunung Klabat. Terdapat perbukitan namun dengan ketinggian 0-350 m. Pada umumnya wilayah Kecamatan yang ada di Kabupaten Minahasa utara memiliki kemiringan lahan dari landai hingga sedang. Suhu udara di wilayah ini bervariasi antara 22^oC -36^oC sepanjang tahun dengan kelembaban udara antara 40% - 87%. Kondisi topografis landai hingga sedang menjadikan wilayah Kabupaten Minahasa Utara sebagai daerah yang cukup panas. Curah hujan terendah dicapai pada bulan Maret dan tertinggi pada bulan Desember. Struktur penggunaan lahan meliputi pemukiman/kawasan terbangun 22,5%, Industri 4,7%, sawah 13%, pertanian lahan kering 23,8%, perkebunan 6%, hutan 28,6%, rawa 0,2%, tambak 0,1%, padang rumput/tanah kosong 0,3%, lain lain 4,6%. Jumlah penduduk Kabupaten

Minahasa Utara berjumlah 199.498 jiwa terdiri atas laki laki 101.270 jiwa dan perempuan 98.228 jiwa.. Tingkat pertumbuhan penduduk rata rata 0,7% dengan tingkat kepadatan sebesar 188 jiwa/km²

Kabupaten Minahasa

Secara astronomis, Minahasa terletak antara 01001'00" - 01029'00" Lintang Utara dan 124034'00" - 125005'00" Bujur Timur. Berdasarkan posisi geografisnya, kabupaten Minahasa memiliki batas-batas: Utara – Laut Sulawesi, Kota Manado, dan Kota Tomohon; Selatan – Laut Maluku dan Kota Tomohon; Barat – Kabupaten Minahasa Selatan dan Kota Tomohon; Timur – Laut Maluku, Kabupaten Minahasa Utara, dan Kota Tomohon.

Akhir tahun 2018, wilayah administrasi Kabupaten Minahasa terdiri dari 25 wilayah kecamatan. Berdasarkan elevasi (ketinggian dari permukaan laut), dataran di Kabupaten Minahasa terdiri dari: 0 m - 100 m = 8 % 101 m - 500 m = 16 % 501 m -1000 m = 76 % 1.001 m keatas = 0 %. Dengan posisi wilayah yang berada pada kisaran ketinggian rata rata antara 500-1000 m dari permukaan laut menjadikan suhu udara tertinggi di capai pada bulan oktober dengan suhu 30°C dan terendah dicapai pada bulan Desember hingga maret dengan suhu udara 16°-17°C dan kelembaban udara antara 88-91%. Wilayah Kabupaten Minahasa bagian utara berbatasan dengan Laut Sulawesi, Kota Manado, dan Kota Tomohon , bagian timur berbatasan dengan Laut Maluku, Kabupaten Minahasa Utara, dan Kota Tomohon, bagian selatan berbatasan dengan Laut Maluku dan Kota Tomohon , dan bagian barat berbatasan dengan Kabupaten Minahasa Selatan dan Kota Tomohon. Diantara 25 Kecamatan yang ada di Kabupaten Minahasa Maka Kecamatan Tombariri Timur dan Kecamatan Kombi adalah 2 Kecamatan dengan luas wilayah terbesar meliputi 19,65% dari luas keseluruhan Kabupaten dimana luas total wilayah Kabupaten Minahasa adalah 1.141,64 km². Penduduk Kabupaten Minahasa tahun 2017 sebanyak 329.003 jiwa (BPS Sulut 2018) yang terdiri atas 168.217 jiwa penduduk laki-laki dan 160.786 jiwa penduduk perempuan. Dibandingkan dengan proyeksi jumlah penduduk tahun 2016, penduduk Minahasa mengalami pertumbuhan sebesar 1,02 persen dengan masing masing persentase pertumbuhan penduduk laki-laki sebesar 0,96 persen dan penduduk perempuan sebesar 1,09 persen. Sementara itu besarnya angka rasio jenis kelamin tahun 2015 penduduk laki-laki terhadap penduduk perempuan sebesar 104,62. Rasio jenis kelamin per kecamatan cukup beragam dengan rasio jenis kelamin tertinggi pada Kecamatan Lembean Timur sebesar 111,76 dan terendah pada Kecamatan Tondano Selatan sebesar 100,68

Struktur penggunaan lahan meliputi pemukiman/kawasan terbangun 24,7%, Industri 2,7%, sawah 11,5%, pertanian lahan kering 27,4%, perkebunan 6%, hutan 20,6%, rawa 0,4%, tambak 0,5%, padang rumput/tanah kosong 0,6%, lain lain 5,6%..

Keadaan Peternakan

Sub sektor peternakan di kedua wilayah penelitian cukup penting dalam membangun sektor pertanian khususnya dalam upaya perluasan kesempatan kerja, pemasukan devisa Negara, peningkatan pendapatan, kesejahteraan peternak dan keluarganya serta peningkatan konsumsi protein hewani dalam rangka peningkatan kecerdasan bangsa. Sub sektor peternakan memberi sumbangan langsung berupa kontribusi PDRB, penyerapan tenaga kerja, peningkatan pendapatan masyarakat, perolehan devisa melalui ekspor, maupun sumbangan tidak langsung seperti penciptaan kondisi yang kondusif bagi pelaksanaan pembangunan dan hubungan sibergis dengan sub sektor dan sektor lainnya.

Kabupaten Minahasa Utara dan Kabupaten Minahasa Di Sulawesi Utara memiliki potensi pendukung bisnis peternakan mulai dari jenis ternak yang beragam, pakan, sumberdaya manusia hingga sarana dan prasarana. Secara umum peternakan di kedua wilayah penelitian ini terdiri atas ternak potong seperti sapi, babi dan kambing serta ternak unggas seperti ayam buras, ayam ras pedaging, ayam ras petelur dan itik. Pada tahun 2017 populasi ternak potong di kedua Kabupaten adalah sapi potong dengan total jumlah 42.109 ekor, 5.627 ekor, babi berjumlah 149.369 ekor, ayam buras 863.190 ekor, ayam broiler 6.319.880 ekor dan ayam petelur berjumlah 528.850 ekor (BPS Sulut, 2018). Ayam pedaging adalah komoditi andalan provinsi Sulawesi Utara dimana pusat produksinya berada di Wilayah Kabupaten Minahasa dan Minahasa Utara. Populasi ternak ayam broiler mencapai 81,36% dari total jumlah ternak ayam broiler di Provinsi Sulawesi Utara yang mencapai 7.766.914 ekor.. Produksi daging ayam broiler menempati posisi kedua dari segi jumlah setelah daging babi yaitu mencapai 7.467 ton dari total produksi daging di Sulawesi Utara yang mencapai 38 000 ton. Produksi daging terbesar di peroleh dari daging babi yaitu 25.534 ton.. Besarnya produksi daging babi berkaitan dengan populasi terbak babi yang cukup banyak dan berat badan yang jauh lebih besar dibanding terak ayam broiler.

Karakteristik Responden

Umur peternak

Berdasarkan kategori umur (Tabel 1) diketahui bahwa usaha peternakan ayam ras pedaging kebanyakan dikelola oleh peternak kelompok umur antara 41-50 tahun sebanyak 33 orang, (37,68%) lebih dari 50 tahun 25 peternak (28,99%) selanjutnya 30-40 tahun sebanyak 23 orang peternak (24,64%), dibawah 30 tahun sebanyak 8 orang. (8,70%). Hasil

tersebut menunjukkan bahwa usah ayam pedaging dikelola oleh peternak yang berada pada usia produktif.

Tabel 1. Usia Peternak Sampel

No.	Usia Peternak (Tahun)	Jumlah (Orang)	Persentasi (%)
1	< 30	8	8,70
2	30-40	23	24,64
3	41-50	33	37,68
4	>50	20	28,99
	Jumlah	87	100

Kemampuan seseorang akan meningkat sampai umur tertentu kemudian mengalami penurunan. Umur peternak akan mempengaruhi fisik, [pikiran dan mental. Peternak berumur muda mempunyai kemampuan fisik lebih kuat dan waktu erja yang lebih lama dibandingkan dengan yang berumur lebih tua. Selain itu umur juga mempengaruhi kemampuan peterbak dalam menerima, memahami dan menerapkan ilmu pengetahuan dan teknologi yag menyangkut usaha peternakannya.

Pendidikan peternak

Pada Tabel 2 tampak bahwa tingkat pendidikan peternak kemitraan ayam ras pedaging di Provinsi Sulawesi Utara bervariasi anantara SD, SMP, SMU sampai Perguruan Tinggi. Tingkat pendidikan peternak terbesar adalah SMU sebanyak 38 orang (43,48%), SMP 31 orang (36,23%), PT 14,49% (13 orang) dan terkecil pendidikan SD sebanyak 5 peternak (5,08%).

Tabel 2. Pendidikan Peternak

No.	Pendidikan Peternak	Jumlah (Orang)	Persentasi (%)
1	SMU	38	43,48
2	SMP	31	36,23
3	PT	13	14,49
4	SD	5	5,08
	Jumlah	87	100

Tingkat pendidikan peternak mempengaruhi cara peternak berfikir dan tingkat penerimaan mereka terhadap inovasi dan teknologi. Semakin tinggi tingkat pendidikan peternak maka akan semakin baik kualitas sumberdaya manusia yang pada gilirannya akan semakin baik pada produktivitas kerjanya

Pengalaman peternak

Pengalaman usaha menunjukkan lama peternak menjalankan usaha peternakan ayam pedaging . Pengalaman peternak yang terlama adalah pada interval 11-15 tahun sebanyak 29 peternak (33,33 %), kemudian 6-10 tahun 28,99% (25 orang), selanjutnay sebanyak 20 orang peternak (23,19%) memiliki pengalaman berusaha ayam pedaging lebih dari 16 tahun dan kurang dari 5 tahun sebanyak 13 orang (14,49%).

Pengalaman merupakan suatu pengetahuan yang diperoleh peternak melalui rutinitas kegiatan sehari hari atau peristiwa peristiwa yang dialami. Jika peternak mempunyai pengalaman yang relative lama dalam mengelola usahanya, umumnya akan memiliki pengetahuan, sikap dan keterampilan yang lebih baik jika dibanding dengan peternak yang kurang pengalaman. Pengalaman berusaha membantu peternak dalam pengambilan keputusan usaha dan memudahkan peternak mengatasi permasalahannya

Skala Usaha

Skala usaha dilihat dari jumlah DOC yang dipelihara peternak pada setiap periode produksi (Tabel 3). Skala usaha merupakan salah satu syarat peternak untuk menjalin kemitraan dan besarnya disesuaikan dengan kapasitas kandang . Sebanyak 49 peternak (56,52%) memiliki skala usaha kurang dari 5000 ekor dan 38 orang (43,48%) memiliki skala usaha lebih dari 5000 ekor (Tabel 6). Rata rata skala usaha peternak sebanyak 5243 ekor dengan sebaran 1500 ekor sampai dengan 14400 ekor per periode. Luas kandang yang dimiliki peternak antara 188-1800 m² dengan kepadatan rata rata 8 ekor/m².

Besarnya skala usaha dipengaruhi oleh kemampuan ekonomi, pengalaman peternak, maupun kerjasama usaha yang dijalin peternak. Peningkatan skala usaha berkaitan dengan kemitraan yang dijalin peternak dengan perusahaan mitra. Penelitian Siswoyo (2002) menunjukkan bahwa peternak kemitraan di Kabupaten Malang memiliki skala usaha rata rata 6583 ekor, sedangkan peternak mandiri hanya 1760 ekor. Bahari (2010) melaporkan bahwa skala usaha pola kemitraan disebabkan sebagian besar biaya produksi seperti pakan, DOC, dan obat obatan disediakan oleh perusahaan mitra sedangkan peternak hanya menyediakan sebagian kecil biaya untuk pembuatan sewa kandang, peralatan, lahan dan tenaga kerja

Tabel 3. Skala Usaha Peternak

No.	Skala Usaha (Ekor)	Jumlah (Orang)	Persentasi (%)
1	≤ 5000	49	56,52
2	≥ 5000	38	43,38

	Jumlah	87	100,00
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Perusahaan Mitra

Kemitraan ayam oedaging di Provinsi Sulawesi Utara berkembang dan mengalami pasang susrut seiring dengan kebijakan pemerintah. Saat ini terdapat 6 perusahaan mitra di Kabupaten Minahasa utara dan Kabupaten Minahasa sebagai sentra produksi ayam pedaging di Sulawesi Utara yang menjalin kemitraan dengan 975 peternak plasma dengan populasi 7,6 juta ekor (Dinas Pertanian dan Peternakan Provinsi Sulut, 2018), dimana sebanyak 3 perusahaan diantaranya merupakan responden dalam penelitian ini. Kelima Prusahaan mitra adalah Charoen Pokphand Jaya Farm, Ciomas Adi Satwa, Cipendawa Fatrm Enterprise.

Berdasarkan hak dan kewajiban perusahaan mitra (Inti) dan peterbak mitra (Plasma) maka kemitraan ayam pedaging di Sulawesi Utara dilaksanakan dengan pola kerjasama operasional agribisnis (KOA) dimana perusahaan mitra berkewajiban menyediakan sarana produksi (DOC, pakan, obat, , vaksin dan desinfektan, bimbingan teknis, dan pemasaran hasil, sedangkan peternak mitra melaksanakan kegiatan budidaya dengan menyediakan kandang, , peralatan dan tenaga kerja. Pola KOA member manfaat pada peternak mitra antara lain (1) stabilitas pendapatan, (2) peningkatan efisiensi melalui bimbingan teknis, manajemen dan akses teknologi (3), keamanan pasar berkaitan dengan standar produk, waktu panen, dan jaminan harga dan (4) akses terhadap capital lebih mudah karena sebagian besar sarana produksi dipenuhi oleh perusahaan mitra. Bagi perusahaan diperoleh manfaat berupa stabilitas produksi dan jaminan kontinuitas supply, efisiensi dan kinerja perusahaan meningkat, perluasan pasar dan memperkuat posisi persaingan di asar, memperluas kesempatan ekspansi dan diversifikasi operasional perusahaan.

Pedagang pemotong

Pemasaran ayam pedaging dari peternak ke konsumen di Sulawesi Utara maupun konsumen di daerah lainnya melibatkan beberapa lembaga pemasaran yaitu pedagang pengumpul, pedagang pemotong, , pedagang pemotong opengecer, dan pedagang pengecer. Pedagang pemotong adalah lembaga pemasaran yang melakukan kegiatan pembelian ayam hidup dari pedagang pengumpul untuk dijual kembali dalam bentuk karkas.

Pada penelitian ini yang dijadikan responden adalah pedagang pemotong yang membeli ayam hidup dari perusahaan mitra untuk kemudian dipotong dan dijual kembali dalam bentuk karkas, baik melalui pedagang pengecer, , ke pasar modern, hotel, restoran maupun di luar daerah. Pedagang pemotong ini memiliki rumah pemotongan ayam kelas C yaitu usaha pemotongan ayam yang menyediakan kebutuhan daging ayam antar Kabupaten Kota dalam provinsi Sulut dengan wilayah pemasaran Kabupaen Minahasa Utara, Kabupaten

Minahasa, Kabupaten Minahasa Selatan, Kota Manado hingga kota Bitung. Berdasarkan pertimbangan bahwa pedagang pemotong memiliki kapasitas potong minimal 1000 ekor per hari dan sudah beroperasi lebih dari 3 tahun maka dipilih 2 pedagang pemotong di setiap wilayah penelitian. Karakteristik pedagang pemotong adalah ulai beroperasi tahun 2010 dengan investasi berkisar antara Rp 550.000.000 sampai dengan Rp. 875.000.000 dengan kapasitas potong perhari sebesar 1250 ekor -1500 ekor dengan produksi karkas 1625 kg sampai dengan 1950 kg/hari. Hasil penelitian menunjukkan bahwa jumlah tenaga kerja yang di gunakan di kedua rumah potong ayam sebanyak 15 dan 20 orang

Policy Analysis Matrix (PAM) Pada Kemitraan Ayam Pedaging Di Provinsi Sulawesi Utara

Identifikasi input dan output

Jika ditinjau dari sisi teknis jumlah produksi yang dihasilkan produsen ditentukan oleh penggunaan input tenaga kerja, modal, bahan baku, lahan, skala ekonomi dan parameter efisiensi (Saptana, dkk, 2003). Input yang digunakan dalam proses produksi dapat dipiosahkan menjadi (a) Tradable goods, dan (b) domestic factor (non tradable goods). Input yang pada kategori pertama adalah input yang dapat diperdagangkan dipasar internasional sedangkan input kategori kedua adalah input yang tidak dapat diperdagangkan dipasar internasional. Pada peternakan ayam pedaging bahan baku berupa sarana produksi yang digunakan seperti bibit ayam (DOC), pakan, obat, vaksin, dan desinfektan serta sapronak lainnya. Unang (2005) menyebutkan bahwa komponen input tradable pada produksi ayam pedaging adalah DOC, pakan, OVD (Obat, vitamin, vaksin dan desinfektan) dan bahan bakar pemanas. Sedangkan faktor domestic terdiri atas biaya tenaga kerja, modal dan sewa lahan. Komponen input untuk peternakan ayam pedaging di Sulawesi Utara disajikan pada Tabel 4.

Tabel 4. Input Output Produksi Kemitraan Ayam Pedaging

Input/output	Satuan	Skala \leq 5000 ekor	Skala $>$ 5000 ekor
Input Tradable			
DOC	ekor	17.014	31.686
Pakan	Kg	56.505	101.723
OVD	Unit	189	194
Gas	Kg	893	1.664
Faktor Domestik			
Tenaga Kerja	Rp/ekor hidup	300	300
Listrik	KwH	608	1.132
Sekam	Rp/ekor	250	250
Lahan	M2	697	1.506
Modal investasi	Rp/tahun	5.504.718	11.886.344
Kandang	M2	436	941
Pemanas	Unit	4	8
Tempat pakan	Unit	117	251
Tempat minum	Unit	59	126
Lain lain	Rp/ekor	150	150
Output			
Pengangkutan, pemotongan dan pemnasaran	Rp/kg	1000	1000
Ayam hidup	Ekor	15.714	29.899
Ayam hidup	Kg	31.093	59.319
Karkas	Kg	21.765	41.523

Jumlah DOC yang dipelihara peternak bervariasi antara 1.500-14.400 ekor menyesuaikan dengan kapasitas kandang, dengan rata rata 3.486 ekor per periode produksi (17.014 ekor/tahun) untuk skala \leq 5.000 ekor) dan 7.528 ekor per periode (31.686 ekrr /tahun) untk, peternak dengan skala pemilihan $>$ 5.000 ekor). Skala pemilikan ini sedikit berbeda dengan penelitian Siswoyo (2002) dan Bahari (2010) yang menyebutkan sebaran DOC peternak plasma di Kabupaten Malang antara 2.500 -12.000 ekor dan 2.000 -12.000 ekor. Rata rata jumlah pakan yang dihabiskan sebanyak 56.505 kg per tahun untuk peternak skala \leq 5.000 ekor dan 101 723 kg untuk skala $>$ 5.000 ekor. Peternak umumnya menggunakan tenaga kerja pria , baik tenaga keluarga maupun tenaga yang disewa. Jumlah TK yang dipekerjakan 1-2 orang untuk 5.000 ekor ayam. Pekerjaan yang dilakukan antara lain pembersihan kandang, kebersihan lingkungan (biosekuriti), pencucian peralatan, dan persiapan masuknya DOC, pemeliharaan meliputi pemberian pakan dan minum , vaksinasi, desinfeksi, dab pengobatan, pengaturan pemanas, dan trai kandang, serta yang terakhir adalah pekerjaan saat panen dan pengangkutan.

Peternak memelihara ayam sebanyak 2-6 siklus produksi dengan rata rata 5 siklus untk peternak skala ≤ 5.000 ekor dan 4 siklus untk peterbak skala > 5.000 ekor dalam satu tahun Satu siklus produksi adalah masa pemeliharaan ayam DOC sampai umur panen antara 32-47 hari. Ayam dipanen dengan bobot antara 1,54 -2,29 kg/ekor dengan konversi pakan 1,62-2,06. Selama satu siklus produksi jumlah ternak yang dipanen 94% atau tingkat mortalitas 6%, lebih tinggi dari mortalitas standart 4,5%. Mortalitas tersebut sama dengan penelitian Zalizar dan Rahayu (2000) juga Siswoyo (2000).

Harga Privat dan Harga Sosial Input dan Output

Harga privat untuk komoditi tradable baik input maupun output dan barang barang impor maupun ekspor diperoleh dari harga pasar (aktual) pada tingkat peternak sedangkan harga social untuk produk produk tersebut adalah border price (harga ipor untuk importables, dan harga ekspor untuk exportables) .Harga pasar intuk input dan output ditingkat peternak adalah harga kontrak yang telah disepakati antarta Perusahaan mitra dan peternak mitra.Harga social (harga efisiensi) untuk, tradable goods adalah harga interasional untuk barang sejenis (Comparable) yang merupakan ukuran social opportunity of cost yang terbaik bagi barang barang tersebut.

Perhitungan harga social untuk, non tradable goods berbeda dengan barang tradable. Harga privat untuk non tradable diambil dari harga pasar pada tingkat peternak seperti Pda barang tradable, namun tidak ada harga dunia untuk non tradable yang bisa digunakan sebagai harga efisiensi. Harga social untuk barang non tradable diestimasi dengan mengurangkan divergensi yang terjadi baik karena distorsi kebijakan maupun kegagalan pasar dari harga privatnya. Bla dampak divergensi tidak bisa diestimasi , langlah berikutnya adalah mencari harga barang sibtitusinya untkj digunakan sebagai Proxy dari harga social barang barang non tradable.

Tabel 5 merangkum harga privat dan social input dan putput kemitraan ayam pedaging di Provinsi Sulawesi Utara.

Tabel 5. Harga Privat dan Sosial Input Output Kemitraan Ayam Pedaging

Kompinen	Satuan	Skala ≤ 5.000 ekor		Skala > 5.000 ekor	
		Privat	Sosial	Privat	Sosial
Tradable Input					
DOC	Rp/ekor	4.671	4.671	4.465	4.465
Pakan	Rp/ekor	4.901	4.741	5.208	5.038
OVD	Rp/unit	48.022	46.548	62.432	60.516
Gas	Rp/kg	4.500	6.250	4.500	6.250
Faktor Domestik					

Tenaga Kerja	Rp/ekor	300	300	300	300
Listrik	Rp/KwH	420	1.163	420	1.163
Sekam	Rp/ekor	250	250	250	250
Lahan	Rp/M2	1.500	1.500	1.500	1.500
Bunga Bank	%/tahun	12,1	12,1	12,1	12,1
CR Kandang	Rp/ekor	883	883	883	883
CR Pemanas	Rp/ ekor	70	70	70	70
CR Tempat makan	Rp/ ekor	209	209	209	209
CR Tempat minum	Rp/ ekor	417	417	417	417
Pengangkutan, pemtongan dan pemasaran	Rp/ ekor	1.000	1.000	1.000	1.000
Lainnya	Rp/ ekor	150	150	150	150
Output					
Ayam hidup	Rp/kg	11.912	11.912	12.504	12.504
Karkas	Rp/kg	19.733	24.220	19.674	24.220

Harga Input Tradable.

DOC (Day old Chick)

Pada periode awal perintisan usaha bibit ayam ras adalah komoditi impor (final stock/FS). Ayam ini dibibitkan hingga menghasilkan anak anak ayam turunan pertama (F1) , turunan kedua (F2) dan seterusnya. Pada penelitian ini harga social DOC FS dihitung sama dengan harga kontrak yaitu Rp 9.671/ekor untuk skala ≤ 5.000 dan Rp 9.565/ ekor untuk skala > 5.000 ekor dengan pertimbangan bahwa bibit ayam pedaging FS sudah bisa dipenuhi dari produksi dalam negeri sejak pemerintah melarang impor DOC tahun 1984. Pertimbangan kedua adalah kemungkinan adanya Collusive Price diantara industry ayam pedaging di Indonesia sangat kecil. (Wiyono, 2006). Fluktuasi permintaan DOC tidak mendorong terjadinya kolusi antara perusahaan pembibitan baik pada kondisi permintaan tinggi maupun rendah ataupun sebaliknya.

Pakan dan OVD (Obat, vaksin deinfeksi)

Pakan dan OVD merupakan dua jenis input yang mengandung komponen asing. Tangenjaya dkk (2002) mengatakan bahwa komponen terbesar dalam pakan ternak ayam ras adalah jagung 51,4% diikuti oleh bungkil kedelai 18,0%, dedak/bekatul 15,0%, pollard 10%, tepung ikan 5% dan feed supplement 0,5%. Pasokan bahan pakan sebagian besar masih tergantung pada impor seperti jagung mencapai 40-50%, bungkil kedelai 95%, tepung ikan 90%-92%, tepung tulang dan vitamin hamper 100% diimpor (Saptana dan Rusastra, 2001). Komponen utama pakan ayam adalah jagung dari sekitar 30 jenis bahan baku yang digunakan dengan tingkat penggunaan berkisar 45-55%. Penggunaan jagung yabg dominan ini disebabkan oleh harganya yang relative murah, kalorinya tinggi, protein dengan asam

amina yang lengkap, mudah diproduksi dan digemari oleh ternak. Hasil perhitungan harga social pakan dan OVD menghasilkan harga Rp. 9.870/kg pakan dan Rp 68.621/unit OVD

Gas

Peternak menggunakan gas sebagai bahan bakar pemanas (brooder) menggantikan minyak tanah. Gas yang digunakan adalah gas bersubsidi pada tabung 3 kg seharga Rp. 4.500/kg. Harga social gas menggunakan standar harga gas tanpa subsidi sebesar Rp. 6.500/kg. Tingkat komponen dalam negeri pemakaian gas tahun 2017 sebesar 63,4% (Kementerian ESDM, 2018). Realisasi tersebut melebihi TKDN tahun 2010 yang ditargetkan berdasarkan cetak biru Kementerian ESDM sebesar 55 persen.

Harga Faktor Domestik

Tenaga Kerja

Hasil penelitian menunjukkan hamper semua tenaga kerja yang digunakan pada usaha budidaya ayam pedaging adalah tenaga kerja unskill (tidak terampil). Hasil ini sesuai dengan hasil penelitian yang dilakukan pada berbagai usaha tani di daerah di Indonesia (Pearson, dkk, 2011). Upah tenaga kerja privat untuk semua kategori tenaga kerja tidak terampil di pedesaan dapat digunakan sebagai oenduga yang baik untuk upah sosialnya. Tingkat upah privat tenaga kerja diketahui Rp.600/ayam hidup. Tingkat upah tersebut juga erupakan tingkat upah social tenaga kerja.

Modal investasi

Perhitungan Capital Recovery Cost (CRC) dari kandang dan asset tetao didasarkan pada informasi tentang biaya pemulihan modal dari sebuah investasi termasuk investasi bangunan kandang, , alat, umur ekonomis, dan nilai sisa. Umur ekonomis bangunan kandang dioerkirakan 10 tahun sedangkan alat pemanas dan alat lainnya 5 tahun dan 3 tahun (Unang, 2013). Berdasarkan penelitian diperlukan biaya investasi awal untuk kandang sebesar Rp. 6.500/ekor, pemanas Rp.500/ekor, tempat makan Rp.600/ekor, tempat minum Rp. 1300/ekor. Berdasarkan umur ekonomis , nilai sisa dan tingkat bunga diperoleh biaya pemulihan modal per tahun untuk kandang Rp.1200/ekor, pemanas Rp.110/ekor, tempat pakan Rp.275/ekor, dan tempat minum Rp 585/ekor

Lahan Sewa

Jika lahan berfungsi sebagai faktor produksi maka harga dan nilainya harus mencerminkan kegunaannya dalam menghasilkan sesuatu yaiotu nilai produksi bersih lahan tersebut selama jangka waktu tertentu sedangkan jika lahan tersebut disewakan maka harga sewanya dapat dianggap mencerminkan nilai lahan tersebut(Soetrisno, 2006). Gittinger (2008) menaksir harga bayangan lahan dengan menggunakan sewa yang diperhitungkan

tiap musim. Pada penelitian ini harga social lahan diperhitungkan sama dengan harga sewa aktualnya yaitu Rp. 2.500/m².

Listrik

Kebutuhan listrik pada usaha peternakan ini tergolong pelanggan golongan R1 dengan daya 900 VA. Jumlah pemakaian listrik rata-rata perbulan 70 kWh dengan tarif bersubsidi Rp. 1.400/kWh. Harga social tarif listrik diperhitungkan tarif tanpa subsidi sebesar biaya pokok produksi listrik yaitu Rp. 3.863/kWh. TKDN untuk pembangkit listrik di Sulawesi Utara, tengah dan Gorontalo adalah sebesar 44% (Depperin, 2016).

Harga Nilai Tukar

Harga social nilai tukar rupiah ditetapkan berdasarkan pendekatan standart conversion factor (SCF) yaitu membandingkan semua nilai impor dan ekspor dengan nilai berdasarkan harga domestic. Nilai tukar bayangan (SER) adalah perbandingan antara nilai tukar resmi dengan SCF. Hasil analisis penelitian menunjukkan bahwa nilai SCF sebesar 0,99 dan nilai SER 9,163

Harga Output

Harga yang digunakan untuk mengukur harga social output adalah harga batas karena sebagian daging ayam adalah komoditas impor. Pada penelitian ini harga social output yang digunakan adalah harga cif daging ayam impor dari Amerika Serikat. Data BPS (2018) bahwa selama 2013-2017 Indonesia mengimpor daging ayam sebanyak 7.488 ton senilai 11.459.193 US\$. Kedalam harga cif kemudian ditambahkan biaya transport dan pemasaran sampai ke pedagang besar di Kabupaten Minut dan Minahasa sehingga diperoleh harga social daging ayam sebesar Rp 24.220/kg. Harga social daging ayam lebih mahal jika dibandingkan dengan harga aktual Rp 22.427/kg

Anggaran Privat dan Anggaran Sosial

Anggaran privat dan anggaran social diperoleh dengan mengalikan kuantitas input dan output pada Tabel 4 dengan harga harga privat dan harga social pada Tabel 5. Struktur biaya privat produksi daging ayam di Provinsi Sulawesi Utara tahun 2019 sebesar Rp. 618.170.354 (Rp. 22.154/kg) untuk skala \leq 5.000 ekor dan Rp 932.988.826 (Rp.20.435/Kg) sedangkan biaya sosialnya masing-masing Rp.587.200.661 (21.645/kg) dan Rp. 897.147.995 (Rp20. 104/kg). Biaya privat usaha ayam pedaging pada kedua skala lebih mahal dibanding biaya sosialnya karena peternak menanggung harga privat pakan Rp. 4.901-5.208/kg lebih mahal dari biaya social pakan Rp. 4.741-5.038/kg

Jika diuraikan berdasarkan sifatnya sebagian besar (87-88%) biaya berasal dari input tradable seperti DOC, pakan, , OVD, dan gas, sedangkan 12-13% peralatan, sewa lahan, bunga modal, sekam, pemotongan, dan pengangkutan (Tabel 6).

Tabel 6. Biaya Input kemitraan ayam pedaging di Sulawesi Utara

Komponen	Tradable Input (Rp/Tahun)	Non Tradable input(Rp/Tahun)	Total Biaya (Rp/Tahun)
Skala ≤ 5.000 ekor Privat	568.752.114	49.418.240	618.170.354
Skala ≤ 5.000 ekor Sosial	537.330.944	49.869.717	587.200.661
Skala > 5.000 ekor Privat	837.405.419	95.583.407	932.988.826
Skala > 5.000 ekor Sosial	800.723.760	96.424.235	897.147.995

Jika diuraikan berdasarkan komponen asing dan domestic, di dalam input tradable maupun non tradable terdapat komponen asing sebanyak 41-42% dan 58-59% komponen domestic (Tabel 7)

Tabel 7. Biaya Kopmponen Asing Dan Domestik

Komponen	Komponen asing (Rp/Tahun)	Komponen domestik input(Rp/Tahun)	Total Biaya (Rp/Tahun)
Skala ≤ 5.000 ekor Privat	253.449.845	358.538.805	618.170.354
Skala ≤ 5.000 ekor Sosial	246.624.278	346.448.390	587.200.661
Skala > 5.000 ekor Privat	391855.307	541.133.519	932.988.826
Skala > 5.000 ekor Sosial	376.802.158	520.345.837	897.147.995

Berdasarkan penggunaannya sebagian besar (66-68%) biaya produksi tersebut digunakan untuk pakan sedangkan sisanya adalah untuk DOC 17-19%, pemotongan dan pemasaran 7-8%, OVD 1-2 %, dan tenaga kerja 1%. Hasil ini berbeda dengan Saptana dan Rusastra (2001) di Bogor dan Tasikmalaya bahwa biaya Rnsum Ayam berkisar antara 50-65%, Yunus (2009) di Palu bahwa biaya pakan 73,54% dan Bahari (2010) di Malang bahwa biaya pakan peternak kemitraan mencapai 77,39%.

Analisis Efisiensi

Tingkat efisiensi ditunjukkan oleh indikator keuntungan privat dan keuntungan social. Keuntungan merupakan selisih antara penerimaan dengan biaya. Pada analisis PAM

keuntungan adalah Excess profit atau return to management yaitu nilai lebih setelah semua biaya diperhitungkan . Apabila suatu sistim agribisnis memperoleh keuntungan privat positif , berarti agribisnis mampu bersaing pada tingkat harga aktual dimana termasuk didalamnya dampak distorsi kebijakan dan kegagalan pasar. . Daya saing tidak hanya berkaitan dengan pihak produsen hasil hasil pertanian tetapi juga pengambil kebijakan sektor pertanian . Lebih dari itu daya saing juga menjadi perhatian oengambil kebijakan yang terkait dengan pengembangan investasi dalam rangka meningkatkan pertumbuhan ekonomi.

Hasil analisis menunjukkan bahwa keuntungan privat peternak pada kedua skala lebih rendah daripada penerimaan sosialnya. Hal ini disebabkan peternak memperoleh harga privat karkas Rp. 19.733-Rp.19.674/kg lebih murah daripada harga sosialnya Rp.24.220/kg. Selisih penerimaan dan biaya memberikan keuntungan privat pada kemitraan ayam pedaging di Provinsi Sulawesi Utara sebesar Rp. 8.689.809 untuk skala ≤ 5.000 ekor dan Rp. 27.186.579 untuk skala > 5.000 ekor (Tabel 8)

Tabel 8. Biaya Penerimaan dan Keuntungan

Komponen	Biaya (Rp/Tahun)	Penerimaan (Rp/Tahun)	Keuntungan (Rp/Tahun)
Skala ≤ 5.000 ekor Privat	618.170.354	609.480.545	8.689.809
Skala ≤ 5.000 ekor Sosial	587.200.661	563.230.613	50.970.048
Skala > 5.000 ekor Privat	932.988.826	905.802.247	27.186.579
Skala > 5.000 ekor Sosial	897.147.995	785.168.594	111.979.401

Tabel 8 menunjukkan bahwa skala usaha > 5.000 ekor lebih menguntungkan dari pada skala ≤ 5.000 ekor. Hal ini disebabkan oleh faktor ekonomis dan faktor teknis. Dilihat dari faktor ekonomis , peternak skala usaha ≤ 5000 memperoleh harga input pakan dan OVD dan harga output lebih murah daripada peternak skala usaha > 5.000 ekor . Hal inio terjadi karena penentuan harga kontrak input tidak mempertimbangkan skala usaha peternak, melainkan dengan pertimbangan harga input dari pabrik. Sedangkan penentuan harga output ayam hidup mempertimbangkan efisiensi teknis yang dicapai oleh peternak. . Ditinjau dari sisi teknis peternak skala ≤ 5000 ekor menghasilkan nilai konversi pakan , bobot badan dan mortalitas ayam yang lebih jelek dibandingkan peternak dengan skala usaha > 5.000 ekor. Angka konversi pakan, bobot badan dan mortalitas ayam peternak skala usaha >5.000 ekor masing masing sebesar 1,74, 2,00 kg dan 6,9% sedangkan skala ≤ 5000 memiliki nilai teknis masing masing 1,81, 1,99 kg dan 8,21%. Hal ini berarti manajemen

usaha skala pemeliharaan > 5.000 ekor lebih baik dibanding skala yang lebih rendah.. Harga ayam peternak dengan skala > 5.000 ekor Rp. 12.504/kg lebih mahal dibandingkan dengan harga ayam peternak skala \leq 5.000 ekor sebesar Rp. 11.912/kg. Pada Tabel 11 menunjukkan bahwa keuntungan privat pada semua skala adalah positif yang berarti agribisnis kemitraan ayam pedaging di Sulawesi Utara efisien dan menguntungkan serta mampu berekspansi. Semakin besar skala usaha maka semakin menguntungkan sehingga pemerintah dan perusahaan mitra perlu mendorong peningkatan usaha agar profitabilitas usaha semakin meningkat.

Analisis Daya Saing

Tingkat daya saing ditunjukkan oleh indikator Privat cost ratio (PCR) dan Domestic resource cost ratio (DRCR) . PCR adalah indikator keunggulan kompetitif yang menunjukkan kemampuan sistem untuk membayar biaya sumberdaya domestic dan tetap kompetitif pada harga privat, sedangkan DRCR merupakan indikator keunggulan komparatif yang menunjukkan jumlah sumberdaya domestic yang dapat dihemat untuk menghasilkan satu unit devisa (Pearson dkk, 2005) . PCR merupakan perbandingan antara biaya faktor domestic dengan nilai tambah output pada harga privat. PCR digunakan untuk mengukur seberapa besar biaya sumberdaya domestic yang dikorbankan untuk memperoleh nilai tambah sebesar satu satuan devisa apabila suatu komoditas diproduksi didalam negeri dan merupakan pengukuran daya saing dalam perekonomian secara aktual.

Hasil perhitungan PCR menunjukkan bahwa peternak ayam pedaging di Sulawesi Utara memiliki keunggulan kompetitif yang ditunjukkan oleh nilai PCR sebesar 0,97 untuk peternak skala \leq 5000 ekor dan 0,94 untuk skala > 5000 ekor (Tabel 9). Hal ini berarti untuk mendapatkan nilai tambah satu satuan devisa (1 US\$) diperlukan 0,97 US\$ (Rp. 13.895) dan 0,94 US\$ (Rp. 13.465) biaya sumberdaya domestic masing masing untuk peternak skala usaha \leq 5000 ekor dan skala usaha > 5000 ekor

Tabel 9 Nilai Daya Saing Kemitraan Ayam Pedaging

Skala Usaha	PCR	DRCR
\leq 5.000 ekor	0,97	0,83
>5.000 ekor	0,94	0,80

Berdasarkan nilai keunggulan komparatif maka kemitraan ayam pedaging di Sulawesi Utara memiliki nilai DRCR sebesar 0,83 dan 0,80 untuk peternak dengan skala usaha \leq 5000 ekor dan > 5000 ekor. Hal ini berarti bahwa untuk menghemat satu satuan devisa (1 US\$) diperlukan 0,83 US\$ (Rp.11.889) dan 0,80 US\$ (Rp. 11.460) biaya faktor domestic masing

masing untuk peternak skala ≤ 5000 ekor dan skala usaha > 5000 ekor. Berdasarkan data tersebut dapat dikatakan bahwa jika daging ayam diproduksi di dalam negeri (Sulawesi Utara) maka akan dapat menghemat devisa daerah (Negara) sebesar 17-20 persen dari biaya impor yang harus dikeluarkan

Analisis Distorsi Kebijakan dan Kegagalan Pasar

Divergensi output

Divergensi buisa positif yang menyebabkan timbulnya implicit subsidi atau transfer sumberdaya yang menambah keuntungan system atau divergensi negative yang menyebabkan implicit pajak atau transfer sumberdaya yang mengurangi keuntungan system. Hasil analisis diperoleh nilai OT kemitraan ayam pedaging Rp. -34.989.546 untuk skala usaha ≤ 5000 ekor dan Rp -70.951.991 untuk skala > 5000 ekor. Nilai OT negative menunjukkan besar kecilnya insentif oprodusen dan pedagang terhadap konsumen daging ayam masing masing sebesar Rp 34.989.546 dan Rp. 70.951.991. Hal ini berarti bahwa konsumen membeli dan produsen menerima dengan harga yang lebih murah daripada harga yang seharusnya.

Untuk mengukur nilai OT yang bebas nilai mata uang digunakan koefisien proteksi output nominal (NPCO/ net protection coefficient on output). Jika NPCO < 1 maka harga domestic lebih rendah dari harga dunia berarti harga domestic di disproteks. Jika NPCO > 1 maka harga domestic lebih tinggi dari harga impor atau ekspor dan jika harga domestic sama dengan harga dunia maka NPCO=1. Hasil penelitian menunjukkan bahwa nilai NPCO untuk kedua skala usaha besarnya 0,92 artinya bahwa harga output aktual (Rp. 19674/kg- Rp. 19733/kg karkas yang diterima oeternak 16% lebih murah daripada harga sosialnya (Rp. 24.220) .

Indikator lain yang digunakan untuk mengukur efisiensi pasar adalah bagian yang diterima oleh peternak (farmer share) dan margin pemasaran . Hasil penelitian berdasarkan data harga ayam pedaging dan karkas di Provinsi Sulawesi Utara tahun 2019 diketahui bahwa margin pemasaran ayam pedaging adalah Rp. 8.230/kg dengan distribusi sebesar 53% (Rp. 4.332) diterima RPA, 30% oleh pengecer (Rp. 2.437), dan 18% (Rp. 1.462) oleh pedagang besar.

Kegagalan pasar dapat dilihat dari transmisi harga daging ayam . Dari data harga ayam pedaging di Sulawesi Utara dan harga daging ayam pada tingkat peternak , harga karkas di tingkat pengecer tahun 2019 diketahui bahwa elastisitas transmisi harga daging ayam pedaging sebesar 0,87 yang berarti bahwa perubahan harga Rp. 100 ditingkat pedagang pengecer diikuti oleh perubahan harga ayam di tingkat peternak Rp. 87

Divergensi Input

Input Tradable

Transfer input (IT) untuk melihat divergensi input yang bebas nilai mata uang digunakan rasio koefisien proteksi input nominal (NPCI/ nominal protection coefficient on input). Rasio ini menunjukkan seberapa besar harga domestic (harga privat) input tradable berbeda dengan harga efisiensinya (harga social). Bila NPCI >1 maka harga domestic input tradable lebih tinggi dari harga input pada tingkat harga dunia. Bila NPCI <1 maka harga domestic lebih rendah dari harga dunia dan sistim seolah olah di subsidi oleh kebijakan yang ada. Jika tidak ada transfer maka harga input domestic tidak berbeda dengan harga dunia, NPCI =1.

Hasil analisis penelitian menunjukkan bahwa nilai IT kemitraan ayam pedaging di Sulawesi Utara Rp. 4.728.338 untuk skala usaha ≤ 5000 ekor dan Rp. 8.970.750 untuk, skala usaha > 5000 ekor. . Nilai IT positif bahwa produsen dan pedagang mengeluarkan implicit pajak akibat kebijakan yang ada masing masing sebesar Rp. 4.728.338 dan Rp. 8.970.750 . Nilai IT skala usaha ≤ 5000 lebih rendah dibanding skala > 5000 ekor karena penggunaan input yang lebih rendah yang ditunjukkan oleh angka FCR skala ≤ 5000 ekor sebesar 1,81 yang lebih tinggi dari FCR > 5000 ekor sebesar 1,74

Faktor Domestik

Hasil analisis memperoleh nilai faktor Transfer (FT) sebesar Rp. 245.152.335 untuk skala ≤ 5000 ekor dan Rp. 242.589.979 untuk skala > 5000 ekor. . Nilai FT positif berarti bahwa peternak dan pedagang mengeluarkan implicit pajak akibat kebijakan yang ada atau transfer kepada produsen faktor domestic atau Pemerintah masing masing sebesar sebesar Rp. 245.152.335 dan Rp. 242.589.979 . Kebijakan pemerintah pada faktor domestic non tradable seperti listrik, mengakibatkan harga sumberdaya domestic dibayar lebih murah daripada harga sosialnya sedangkan faktor domestic tradable seperti pakan, dan obat obatan lebih mahal dari harga paritas impornya (Tabel 10)

Tabel 10. Transfer Faktor Berdasarkan Skala Usaha

Skala	Biaya faktor Privat (Rp/thn)	Biaya faktor social (Rp/thn)	Faktor transfer (Rp/thn)
≤ 5000	245.152.335	242.589.979	2.562.355
> 5000	456.026.723	451.156.643	4.870.080

Divergensi Input Output

Net transfer (transfer bersih) peternakan ayam pedaging kemitraan di Sulawesi Utara sebesar Rp. -42.280.240 per tahun pada skala ≤ 5000 ekor dan -84.792.822 untuk skala usaha

>5000 ekor. NT negative menunjukkan besarnya deficit produsen ayam pedaging yang disebabkan kebijakan pemerintah dan ditunjukkan oleh koefisien keuntungan (PC) yaitu rasio keuntungan privat dengan keuntungan social sebesar 0,17 untuk skala ≤ 5000 ekor dan 0,24 untuk skala > 5000 ekor. Artinya transfer bersih sebesar diatas menyebabkan keuntungan privat hanya 17% dan 24% dari yang seharusnya. Seandainya tidak ada policy transfer. Nilai NT negative yang cukup besar dan PC rendah menunjukkan jumlah implicit pajak yang dibayar peternakan ayam pedaging setiap tahun. Nilai EPC (effective porotection coefficient) sebesar 0,86 pada kedua skala usaha peternakan ayam pedaging di Sulut berarti bahwa nilai tambah output pada harga privat hanya sebesar 86% dan nilai tambah pada keadaan persaingan sempurna.

Disamping hasil yang sudah dioeroleh melalui penelitian ini , tim peneliti sudah berhasil mempublikasikan hasil penelitian di jurnal internasional yaitu pada jurnal of Business Management yang dipublikasi pada volume 5 nomor 10 bulan oktober 2019 dengan judul artikel BUSINESS FEASIBILITY AND CULTIVATION MANAGEMENT OF BROILER UNDER PARTNERSHIP SCHEME. Selain itu luaran lainnya adalah peneliti menjadi pembicara dalam International Conference Vocational on Higher Education (ICVHE) PADA tanggal 5-7 Agustus 2019 dimana kegiatan seminar internasional tersebut diselenggarakan oleh Unkiversitas Indonesia bekerjasama dengan UNSRAT. Namun deminkian sesuai dengan informasi yang diperoleh dari panitia pelaksana bahwa prosiding seminar baru akan di publikasikan atau di terbitkan dalam kurun waktu 6 bulan kedepan terhitung sejak pelaksanaan kegiatan seminar.

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D. STATUS LUARAN: Tuliskan jenis, identitas dan status ketercapaiansetiap luaran wajib dan luaran tambahan (jika ada)yang dijanjikan. Jenis luarandapat berupa publikasi, perolehan kekayaan intelektual, hasil pengujian atau luaran lainnya yang telah dijanjikan pada proposal. Uraian status luaran harus didukung dengan bukti kemajuan ketercapaian luaran sesuai dengan luaran yang dijanjikan. Lengkapi isian jenis luaran yang dijanjikan serta mengunggah bukti dokumen ketercapaian luaran wajib dan luaran tambahan melalui Simlitabmas.

Sampai dengan laporan kemajuan ini dibuat maka luaran wajib yang di targetkan pada tahun pertama sudah berstatus published karena sudah dipublikasi pada salah satu jurnal internasional yaitu Journal of Business Management Volume 5 nomor 10 bulan oktober 2019. Sedangkan luaran tambahan yang ditargetkan pada tahun 2019 (tahun pertama penelitian) berupa publikasi pada prosiding seminar internasional yaitu pada The 4th International Conference of Vocational Higher Education dilaksanakan oleh Universitas Indonesia sudah sampai pada tahapan status Accepted dan sudah dilaksanakan presentasi oral pada tanggal 5-7 Agustus 2019. Namun demikian Publikasi prosidingnya sesuai dengan informasi dari panitia penyelenggara yaitu Program Vokasi Universitas Indonesia

masih akan menunggu sekitar 6 (enam) bulan kedepan atau pada awal tahun 2020 karena menunggu proses perampungannya sebagai prosiding yang terindeks. Bukti kemajuan tercapainya luaran berupa publikasi ilmiah di jurnal internasional dapat ditelusuri melalui url : <https://www.ijrdo.org/index.php/bm/article/view/3272/2552> dan bukti dokumen sudah diunggah pada simlitabmas bersama sama dengan bukti sertifikat dari panitia pelaksana The 4th International Conference of Vocational Higher Education (ICVHE) 2019 sebagai bukti sudah membawakan presentasi oral dalam seminar internasional tersebut. Selain itu pihak panitia penyelenggara telah menerbitkan buku abstrak pelaksanaan konferensi Sedangkan bukti prosiding seminar internasional sebagai luaran dari The 4th ICVHE 2019 sampai dengan laporan ini dibuat masih sedang menunggu informasi lebih lanjut dari panitia pelaksana seminar karena berdasarkan surat pemberitahuan dari panitia pelaksana bahwa membutuhkan waktu 6-12 bulan untuk proses penerbitan prosiding tersebut.. Berikut ini adalah bukti pelaksanaan presentasi oral dari peneliti pada kegiatan seminar tersebut... serta abstrak yang dipublikasi oleh panitia pelaksana



E. PERAN MITRA: Tuliskan realisasi kerjasama dan kontribusi Mitra baik *in-kind* maupun *in-cash* (untuk Penelitian Terapan, Penelitian Pengembangan, PTUPT, PPUPT serta KRUPPT). Bukti pendukung realisasi kerjasama dan realisasi kontribusi mitra dilaporkan sesuai dengan kondisi yang sebenarnya. Bukti dokumen realisasi kerjasama dengan Mitra diunggah melalui Simlitabmas.

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F. KENDALA PELAKSANAAN PENELITIAN: Tuliskan kesulitan atau hambatan yang dihadapi selama melakukan penelitian dan mencapai luaran yang dijanjikan, termasuk penjelasan jika pelaksanaan

penelitian dan luaran penelitian tidak sesuai dengan yang direncanakan atau dijanjikan.

Kendala yang di temui dalam proses penelitian ini berkaitan dengan publikasi atau pencapaian luaran penelitian. Hal ini berkaitan dengan proses publikasi yang memakan waktu yang cukup lama sejak dari proses submit . Publikasi artikel pada prosiding seminar internasional (The 4th International conference of Vocational Higher Education membutuhkan waktu 6-12 bulan sejak dari proses pelaksanaan konferensi sehingga harus melewati batas waktu penelitian yang hanya 1 tahun. Sementara untuk publikasi di jurnal internasional terindeks seperti Scopus juga harus menunggu dengan waktu yang cukup lama pula. Kendala pada proses penelitian adalah perolehan informasi pada peternak yang sering tidak sesuai dengan informasi yang diperoleh pada data BPS, informasi tentang penghasilan perusahaan mitra dari program kemitraan dengan peternak diluar peternak sampel cukup sulit diperoleh dengan alasan kerahasiaan perusahaan. Luaran tambahan berupa publikasi pada seminar nasional tidak terlaksana karena peneliti mengalihkan kegiatan seminar pada seminar internasional yang dilaksanakan pada waktu yang lebih cepat daripada jadwal beberapa seminar nasional.

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G. RENCANA TAHAPAN SELANJUTNYA: Tuliskan dan uraikan rencana penelitian di tahun berikutnya berdasarkan indikator luaran yang telah dicapai, rencana realisasi luaran wajib yang dijanjikan dan tambahan (jika ada) di tahun berikutnya serta *roadmap* penelitian keseluruhan. Pada bagian ini diperbolehkan untuk melengkapi penjelasan dari setiap tahapan dalam metoda yang akan direncanakan termasuk jadwal berkaitan dengan strategi untuk mencapai luaran seperti yang telah dijanjikan dalam proposal. Jika diperlukan, penjelasan dapat juga dilengkapi dengan gambar, tabel, diagram, serta pustaka yang relevan. Jika laporan kemajuan merupakan laporan pelaksanaan tahun terakhir, pada bagian ini dapat dituliskan rencana penyelesaian target yang belum tercapai.

Pada tahun kedua pelaksanaan penelitian ini tim peneliti akan melakukan analisis **sensitivitas** perubahan harga pakan, harga daging ayam, nilai tukar rupiah secara parsial, kombinasi harga daging ayam dan harga pakan secara simultan, kombinasi harga daging ayam dan nilai tukar rupiah secara simultan, kombinasi harga pakan dan nilai tukar rupiah secara simultan dan kombinasi harga pakan, harga daging ayam dan nilai tukar rupiah secara simultan **terhadap daya saing** kemitraan ayam pedaging di wilayah sentra produksi ayam pedaging Provinsi Sulawesi Utara (Kabupaten Minahasa Utara dan Kabupaten Minahasa). Selain itu pada tahun kedua tim peneliti masih akan mempublikasikan hasil penelitian sebagai luaran wajib di jurnal internasional, atau luaran tambahan pada prosiding nasional atau prosiding internasional. Pada tahun kedua ini maka diharapkan artikel ilmiah yang sudah di presentasikan pada konferensi internasional (The 4th ICVHE 2019) akan dipublikasikan sesuai dengan informasi panitia pelaksana. Pada prinsipnya metoda penelitian yang akan dilakukan pada tahun kedua masih sama dengan tahun pertama dimana akan dilakukan pemutahiran data melalui pengumpulan data terbaru pada sampel responden peternak plasma yang berjumlah 87 sampel peternak terdiri atas 53 peternak di Kabupaten Minahasa Utara , 34 peternak di Kabupaten Minahasa. Disamping itu dipilih 3 perusahaan mitra serta 2 pedagang pemotong dimasing masing wilayah penelitian. yang sudah ditetapkan pada tahun pertama program peneltian ini meliputi berbagai aspek yang akan menjadi objek analisis termasuk didalamnya variabel harga pakan, harga daging ayam, nilai tukar rupiah, dan pemutahiran data untuk melengkapi table PAM (Policy analysis Matrix) seperti input tradable dan input non tradable juga berbagai biaya komponen asing dan faktor domestik. Proses pengumpulan data direncanakan selama 1,5 hingga 2 bulan di 2 lokasi peneltian yaitu Kabupaen Minahasa Utara 53 peternak dan Kabupaten Minahasa 34 peternak mitra disamping pada 3 perusahaan mitra dan 2 pedagang pemotong. Untuk mencapai luaran penelitian maka proses analisis data direncanakan akan berlangsung selama 1 bulan sehingga masih tersisa waktu yang cukup untuk memasukkan artikel hasil penelitian di jurnal internasional sebagai luaran wajib dan kegiatan seminar nasional atau seminar internasional sebagai luaran tambahan mengingat proses untuk publikasi di jurnal internasional dan prosiding seminar nasional atau seminar internasional membutuhkan waktu yang cukup lama

sehingga tim peneliti akan mengatur waktu penelitian seefisien mungkin agar luaran yang ditargetkan dapat diperoleh sampai dengan akhir tahun kedua program penelitian ini.

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H. DAFTAR PUSTAKA: Penyusunan Daftar Pustaka berdasarkan sistem nomor sesuai dengan urutan pengutipan. Hanya pustaka yang disitasi pada laporan kemajuan yang dicantumkan dalam Daftar Pustaka.

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Dokumen pendukung luaran Wajib #1

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BUSINESS FEASIBILITY AND CULTIVATION MANAGEMENT OF BROILER UNDER PARTNERSHIP SCHEME

(A Case Study of Plasma Breeders and PT Charoen Pokphan Jaya Farm in the Sub-district of Kalawat, District of North Minahasa, Indonesia)

Erwin Wantasen .*, S. J. K. Umboh, J. R. Leke, and F. N. Sompie

*Faculty of Animal Science, Sam Ratulangi University,
Manado-95115, Indonesia*

**corresponding author: erwinwantasen@yahoo.co.id*

Abstract

This study goals to investigate business feasibility of broiler cultivation under partnership scheme between plasma breeders and PT Charoen Pokphan Jaya Farm, in the Sub-district of Kalawat, District of North Minahasa, Province of North Sulawesi, and acknowledge cultivation management, income, and Break Even point value. Thus, the site of research was employed purposive method. While, selection method of respondents, as sample, was done by census sampling against 15 plasma breeders. As a result, this research finds that partnership scheme of plasma breeders and PT Charoen Pokphan Jaya Farm was Public Main Company (PIR). Reasonably, this was used since it was beneficially profitable in capital fulfillment for plasma breeders, where the main company provided production facility of husbandry and marketing insurance. Further, Break Even Point (BEP) within a unit was 6,599,03 kilograms, and breeders' averagely production mean was 8,275 kilograms. While, BEP (in Rupiah) was Rp. 14,350 /kg and its breeders' average sales was Rp. 17,822 /kg. In sum up, it shows that broiler business under partnership scheme performed by PT Charoen Pokphan Jaya Farm in the Sub-district of Kalawat had reached its BEP unit and BEP in Rupiah. The gross B/C value of broiler cultivation was 1,32. According to economic analysis, income, the measurement of BEP and gross B/C can be concluded that partnership scheme of broiler in the Sub-district of Kalawat, District of North Minahasa was beneficially profitable and feasible to be developed further.

Keywords: business analysis, income, broiler partnership

Introduction

Background

Productively, broiler has highly productivity, mainly in producing meat. It then is able to produce one kilogram of meat, only within 30-45 days. From its texture, its meat is delicately tender, and its bone is easily crushed, while biting. A better broiler is broiler consuming two kilograms of feed to produce one kilogram of its body's weight (Lima and Naas, 2005; Maulana *et al.*, 2014; Kadek *et al.*, 2015).

One of company producing broiler is PT. Charoen Pokphan Jaya Farm, a company operating in husbandry, including poultry. It specifically concerns on broiler under partnership scheme in order to increasingly assist in accelerating productivity, quantity, quality, and efficiency of broiler's well-management. In this case, PT. Charoen Pokphan Jaya Farm is provider of husbandry facility, comprising of DOC (Day Old Chick), feed, medicine, vaccine, marketing (ready-to-harvest broiler) and Field Counseling Officer (PPL) dispersedly assigned to plasma by pricing agreement in advance (contract price).

Since 1984, husbandry partnership pattern has been developed in Indonesia through People Main Company (PIR) in poultry. This company functions as parental and public breeders is its plasma, henceforth well-known as Main-Plasma. Under this partnership, it can expectedly become solution to stimulate breeders' intention as public breeders, having relatively small capital (Areerat *et al.*, 2012; Salam *et al.*, 2006).

In fact, PT. Charoen Pokphan Jaya Farm is one of broiler producing company conducting the main-plasma partnership with local breeders in the Sub-district of Kalawat. The objective is to accelerate income, improve breeders' resources, and develop better business scale from, either parental company or breeders itself. To respond such facts, there have been previously many researches observing financial profit of broiler husbandry (Nursinah *et al.*, 2012; Mappigau and Jusni, 2012; Noonari *et al.*, 2015). However, there is none of study analyzing financial profit business feasibility, and cultivation management of broiler under partnership scheme in the Sub-district of Kalawat, District of North Minahasa, Province of North Sulawesi, Indonesia. Therefore, this research is purposively aimed to know financial profit, business feasibility, and cultivation management of broiler husbandry under partnership scheme performed in the Sub-district of Kalwat, District of North

Minahasa.

Research Method

Base Method

The method used in this research was descriptive analysis, a method employed to observe status, object, condition, mindset, a series of events of human groups in present situation or a systematic, actual, and accurate description of facts, characteristics of inter-phenomena relation being investigated. Thus, the result of descriptive analysis is presented in information or remark (Sugiyono, 2009).

Application Method

In this research, application method was case study, examining individual or unit of certain social comprehensively. The design of case study provides possibility to researcher in obtaining in-depth insights concerning on basic aspects of human's behavior since case study attempts to perform comprehensive, intensive, detailed and thorough investigation (Idrus, 2007).

Sampling Method

Site

The sampling method of site performed by purposive, a sampling based on intentionality. It was considered that the Sub-district of Kalawat, District of North Minahasa had the most densely broiler population under the main-plasma partnership of PT Charoen Pokphan Jaya Farm and breeders.

Respondent

Also, the sampling method of respondent utilized purposive sampling, or deliberately selected, where data collection of respondent was taken in plasma husbandry located in the Sub-district of Kalawat, District of North Minahasa. Then, there were 15 respondents as sample of breeders according to census sampling. It is sampling method where each element of existing population is recorded and given opportunity to be selected as sample.

Data Collecting Technique

The data of this research was collected using survey technique based on list of

questions. Further, recording and field observation were performed in the research’s site in order to complete information obtained from interview.

Type and Source of Data

Data utilized in this research was primary and secondary data. Primary data was obtained from direct sources (direct information) specifically containing any information or data concerning on the research. While, secondary data was gained from second sources (third person, not main person) having information or data related to this research.

Findings and Discussion

Financial Profit and Business Feasibility of Broiler Partnership

a. Analysis of Total Cost

Total cost is cost derived from calculation of Fixed Cost (FC) and Variable Cost (VC) utilized during production process. According to research’s finding performed in the Sub-district of Kalawat, District of North Minahasa, average population of broiler was 3,865 broilers, and the rate of harvest age was 40 days. In detail, the result is presented in following Table 1.

Table 1. Total Cost Rate of Broiler Husbandry from Respondent within One Period

Cost (IDR/period)	Total
Fixed Cost	3,123,316
Variable Cost	107,335,852
Total Cost	110,479,168

According above table, expenses for broiler cultivation comprises of fixed and variable cost. During the research, fixed cost consisted of depreciation cost of cages and tools and temporary tax depreciation, while variable cost was cost of DOC, feed, OVK and operational.

Breeders under partnership scheme with PT. Charoen Pokphan Jaya Farm, in the Sub-district of Kalawat, expensed fixed cost of Rp. 3,123,316 per period (for ± 40 days) and variable cost of Rp. 107,335,852. Overall, total cost was Rp. 110,479,168 for one time period (Table 1). Similarly, this finding is in accordance

with previous research, stating that production cost of poultry business in the West Papua was Rp. 112,685,543 per production period (Widayati *et al.*, 2017).

b. Income Analysis

Income gained by breeders is multiplying result of broiler’s weight produced within one period in kilogram (kg) and contract price in Rupiah (IDR). Below is table of income from broiler production in the Sub-district of Kalawat

Table 2. Production Rate and Total of Income of Respondents within One Period

Cost	Total
Production (kg/period)	8,275
Contract Price (IDR/kg)	17,822
Income (IDR/period)	147,477,050

Based on above Table 2, total of income gained by breeders within one period is Rp. 147,477,050, derived from multiplication of production (8,275) and contract price (17,822).

c. Profit Analysis

Profit is difference of income and expenses (total cost). Table 3 below shows breeder’s profit rate observed from the research’s finding in the Sub-district of Kalawat, District of North Minahasa, as follows:

Table 3. Profit Rate of Respondents in the Sub-district of Kalawat within One Period

Description	Result (IDR/period)
Total of income	147,477,050
Total cost	110,479,168
Profit	36,997,882

In this research, total of income was gained by multiplying total of broiler production with broiler price, prevailed during the research conducted, which was Rp. 17,822 per kg of broiler. Thus, according to above Table 3, it can be concluded that profit rate of breeders per period in the Sub-district of Kalawat, District of North Minahasa was Rp. 36,997,882.

d. Gross Benefit Cost Ratio (Gross B/C)

The calculation of Gross B/C was aimed to know business feasibility of partnership husbandry in the Sub-district of Kalwat, District of North Minahasa, that was a comparison of present value benefit and present value cost. Whereas Gross B/C was > 1 , the business was feasibly performed. Contrastingly, if Gross B/C was < 1 , the business was not feasibly performed.

$$\begin{aligned}\text{Gross B/C} &= \text{total of income rate/production cost rate} \\ &= \text{Rp. } 147,477,050/\text{Rp. } 110,479,168 \\ &= 1,32\end{aligned}$$

From above calculation of Gross B/C Ratio value, breeders under partnership of PT Charoen Pokphan in the Sub-district of Kalawat depicted 1,32. Consequently, this husbandry under partnership scheme was feasibly performed since its Gross B/C Ratio value was more than 1.

e. Break Even Point (BEP)

BEP (Break Even Point) is result of production sales within certain period, which its amount is equal with expenses. Therefore, businessman neither suffers from loss, nor profit during that period, or breakeven point.

$$\begin{aligned}\text{BEP of Unit} &= \text{Total cost/Selling price per kg} \\ &= 110,479,168/ 17,822 \\ &= 6,599,03 \text{ kg} \\ \text{BEP of Price} &= \text{Total cost/Total of production} \\ &= 110.479.168/8.275 \\ &= \text{Rp.}14,350\end{aligned}$$

The result of production rate of broiler's breeders partnered with PT. Charoen Pokphan Jaya Farm, in the Sub-district of Kalawat, District of North Minahasa was 8,275 kilograms and its BEP value (unit) was 6,599,03 kilograms, so, by its production of 6,599,03 kilograms, breakeven point was achieved. Then, broiler husbandry under partnership was feasibly performed.

Moreover, BEP value (IDR/Rp) from broiler husbandry within main-plasma

partnership program with PT. Charoen Pokphan, in the Sub-district of Kalawat, District of North Minahasa touched Rp. 14,350/kg and its selling price in breeders was averagely Rp. 17,822/kg. Hence, with its selling price of Rp. 14,350/kg, breakeven point was occurred. Significantly, broiler husbandry in the Sub-district of Kalawat was feasibly performed, viewed from its BEP value according to Rupiah (IDR). Average total cost of broiler under main-plasma partnership program was Rp. 110,479,168. In addition, by population rate of 3.865 broilers, profit rate obtained was Rp. 36,997,882 with one cultivation during \pm 40 days. Likewise, this finding is similarly in accordance with Firdaus and Komalasari (2010), reporting that integration of broiler production and food crops provided beneficially profit for breeders. In contrast, this finding is against with Raut *et al.* (2017) stating that investment in broiler husbandry served big-scale profit, yet its profit was relatively small experienced in small-scale business, lower than 4500 broilers.

f. Cultivation Management of Broiler

Cultivation management stipulated from the company comprised of 1:700 ratio (one heater for 700 broilers), 1:50 ratio (one feed box for 50 DOC), and 1:50 ratio (one drinking container for 50 DOC). Specifically, for feeding box and drinking container aimed to mature broiler, its ratio was 1:30-40 broilers. Heater operated for 24 hours during 3-4 days, under feeding frequency of the first one week for 6-8 times/day. For paddy husk, total of post-brooding was maximally for 7 days, and external curtain and plafond were mandatorily available to sustain optimal temperature target during brooding phase.

DOC given to breeders was 2-3 days of age and its cultivation was 36 days. The harvest age of company's broilers was determined by company following market price, by its maximal cultivation of 40 days. Thus, the broiler's weight during harvest time was between 1,80-2,50 kg. During cultivation management process of broiler, the company provided counseling via field counseling officer (PPL), frequently once in three days, or as breeders dealt with issues, they mandatorily reported directly to PPL (Al Sharafat and Al Fawwaz., 2013).

Plasma, then, was responsible to carefully cultivate broilers, supplied by the parental company, supervised and counseled by PPL. In addition, plasma was obliged to clean and spray disinfectant along cages in order to be free from diseases derived from harvested broilers, inspect unhealthy broilers, and provide clean water for drinking. Unfortunately, the local government had not participated during

cultivation phase since all tasks were fully assigned to the company.

High mortality level of broiler was resulted from insufficient ratio used. If ratio was stipulated by the company and followed carefully by breeders and breeders could not, in contrast, supervise overweight broilers, it would affect on broiler's feeding need. Subsequently, narrow area for DOC also affected on high mortality of broiler. It was due to narrow movement of broiler and competing ability to feed with other broilers (Oloyo, 2018; Bose *et al.*, 2015)

The DOC quality supplied from the company provided adverse effect on mortality level. There were various DOCs derived from breeders. As breeders obtained better and healthy DOC, mortality could be decreasingly suppressed, and *vice versa*.

At last, it suggests that since all types of DOC can enter the parental company, and the company did not select such DOC, there should be supervisory from local government to provide criteria of better DOC given to breeders in order to minimize high mortality of broilers (Rana *et al.*, 2012)

Conclusion

Cultivation management performed by plasma breeders uses standard management stipulated by the company. It comprises of 1:700 ratio for heater and broilers, and 1:50 ratio for feeding and drinking container and DOC, respectively. While, for mature broiler, its ratio is 1:30-40 broilers. Moreover, there is PPL counseling from company in supervising broiler progress once in three days. Finally, partnership scheme of broiler performed by local breeders and PT Charoen Pokphan, located in the Sub-district of Kalawat, District of North Minahasa is financially feasible and better to be developed by other breeders.

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Dokumen pendukung luaran Tambahan #1

Luaran dijanjikan: Prosiding dalam pertemuan ilmiah Nasional

Target: sudah terbit/sudah dilaksanakan

Dicapai: Submitted

Dokumen wajib diunggah:

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Dokumen sudah diunggah:

1. Naskah artikel
2. Bukti submit

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Raise Pattern and Biosecurity Application by Broiler Breeders on Different Topography in North Sulawesi Province

Erwin Wantasen *¹, *Sintya J.K. Umboh*¹, and *E.K.M Endoh*¹

¹Department of Socio-Economics, Faculty of Animal Husbandry, Sam Ratulangi University, Manado, Indonesia

* Corresponding author: erwinwantasen@yahoo.co.id

Abstract. The purpose of this study was to obtain information about the raising pattern and level of biosecurity application conducted by broiler breeders in different types of topography in North Sulawesi Province. The research location was the District of Minahasa representing the highlands and District of Minahasa Utara representing the lowland region. The scale of broilers husbandry in the two study areas consisted of small scale (<5000 broilers), medium scale (> 5000 - 10000 broilers) and large scale (> 10000 broilers) for each of production periods. At each scale, 5 breeders were taken as respondents, so that the total of respondent samples was 30 breeders. Data obtained then was analyzed descriptively and quantitatively. The result shows that broilers in the lowlands generally raised for 4-5 weeks with an average weight of 1.2 - 1.3 kg/broiler, while broilers were raised by breeders in the highlands had gained weight of 1.4 - 1.7 kg/broiler. Raising broilers in small-scale business used all in-all out system with family workers, while breeders in medium and large-scale husbandry in both topographic areas used raising pattern and marketing gradually using special labor. As many as 100% of breeders in the lowland areas within a large-scale husbandry had already health programs under the supervision of veterinarians and 80% of large-scale breeders in the highlands did the same. In both research areas, it showed that broiler breeders on the three scales made effort to prevent the risk by burning and burying dead chickens with a percentage of 60-100%.

Keywords: Raising pattern, breeders' ability, broiler

1. Introduction

One of husbandry commodities becoming source of living and protein for society is broiler. Broiler is relatively well-liked by breeders since it can gain weight until 1,2 -1,3 kg within relatively short period of raising, during 4-5 weeks. It may happen if it is supported with a better management of production conducted by breeders [1,2].

Recently, the condition of broiler has sometimes dealt with less profitable situation, where there is unstable price of production infrastructure in the market. Such condition, then, is occurring annually, so that small-scale breeders suffer from loss. Technically speaking, there is a difference between raising pattern and profitability in broiler cultivated in low and high land. In any high temperature, broiler's performance drastically decreases, so there is a different profitability with broiler cultivated in fresher and more mild temperature. All those factors will determine breeders' productivity in raising broiler, mainly on business's pattern and scale. Both business's pattern and scale will result on business's productivity and efficiency [3]. Improvement of economic efficiency can be performed by using a better technology, using total of input and optimal raising scale [4]. The husbandry, theoretically, is divided into four business's pattern, namely side-job business, branch of business, main business, and industry. Those business's patterns are necessarily required in a better management of raising in order to obtain broiler always in good performance and condition, so that breeders can avoid any loss occurred. Therefore, a step to be taken by breeders is applying biosecurity technique. Biosecurity is breeders' effort to avoid disease's penetrated infection from one husbandry to other husbandries [5,6].

North Sulawesi is one of regions producing broiler by total of boiler's population in 2018 of 7,7 million broilers. Two districts having the largest population of broiler in North Sulawesi are District of Minahasa Utara, with total of population of 4.5 million broilers (58.4%) and production of broiler of 4,118 ton; and District of Minahasa, having total of broiler's population of 1.9 million broilers (25.3%) with production of broiler of 1,516 ton [7]. District of North Minahasa is located in the lowland, while, contrarily, District of Minahasais in the highland. This topographic different is presumably assumed resulting on difference of raising pattern and husbandry's productivity due to different physical environment. Non-conducive environment will cause broiler vulnerably infected by any disease, meaning that both breeders in these districts should apply biosecurity principles. Applying principle of biosecurity is by reducing any risk resulted by human's mobility in the cages, animals, organic or inorganic materials [8]. Particularly, principles of biosecurity comprise of establishing, improving, reducing, detecting, dimension, and selecting. Such risk mentioned above should be avoided since it will potentially become entrance of diseases' seeds. Research on biosecurity application has been done by previous researchers [9-11]. However, information on biosecurity application by broiler's breeders in different topography, such as in the low and highland along with its raising pattern, is relatively limited. Hence, this research will analyze different raising pattern of broiler, profitability, and biosecurity application by breeders in both District of Minahasa and District of North Minahasa.

2. Research Methodology

2.1. Sampling method and data collecting technique

The research was conducted in District of North Minahasarepresenting the lowland and District of Minahasarepresenting the highland. It was done on January to February 2019. In each of districts, it then was selected 2 (two) sub-districts purposively by consideration that it had breeders having ever obtained training and applied regional biosecurity management with the largest population of broiler in respectively every district [7]. Sub-district turned as research's site was Sub-district of DimembeandKalawat (District of North Minahasa), Sub-district of Sonder andTondano Utara (District of Minahasa). There were three scales of broiler husbandry in the District of North Minahasa, such as <5000 broilers(32 breeders), >5000-10000 broilers (16 breeders) and>10000 broilers (10 breeders). Meanwhile, breeders in the District of Minahasa had business scale of <5000 broilers (25 breeders), >5000-10000 broilers (14 breeders) and >10000 broilers (10 breeders). In each of business scales, 5 breeders, thus, were purposively selected in each district respectively [12] by consideration that those breeders had followed training of biosecurity management in broiler's husbandry, so the total of samplings was 30 breeders.Further, data was collected by survey technique using questionnaire. Data gathered then was primary data comprising of technical data, such as mortality, broiler's weight, feeds consumption, business scale, business model, raising pattern, procurement model of production equipment, income, and aspects of biosecurity application used by breeders.

2.2 Data analysis

Data collected was, hence, analyzed descriptively and quantitatively. Descriptive analysis comprised on characteristic of broiler husbandry, such weight, raising pattern, marketing, business model, procurement model of production equipment, labor, raising period. Whereas, quantitative analysis consisted on calculation of broiler's index and income using following formulation, [4]

$$\text{Broiler's index} = \frac{(100 - \% \text{ mortality}) \times \text{mean of weight/broiler}}{\text{feeds conversion} \times \text{raising period}} \dots\dots\dots (1)$$

$$\text{Income} = \text{TR} - \text{TC} \dots\dots\dots (2)$$

Where:

TR = Total of income in broiler husbandry (Rp/production period)

TC = Total of production cost in broiler husbandry (Rp/production period)

Next, the calculation of biosecurity variable used score obtained from data collected. Data management utilized descriptive method and statistical analysis. Each response of respondents was classified into fivecategories and given score. The score was stated in numerical of 1,2,3,4, and 5 for each answer, which the highest score was 5 and the lowest was 1 [13].Such score, later, was categorized into 2 parts, namely Pre-Entryand Point of Entry. In addition, such score in respective groups was calculated in total and a mean was gained from it. Further, this score was analyzed using Independent Sample *t* Testassisted by SPSS.22 program, by following formulation as follows, [14]

$$t = \frac{Xa - Xb}{Sp \sqrt{\frac{1}{na} + \frac{1}{nb}}} \dots\dots\dots (3)$$

Where:

Xa = mean of group a, Xb = mean of group b, Sp = combined deviation standard, na = total of samples in group a, nb = total of samples in group b.

3. Findings and Discussion

3.1. Business model

The result of this research demonstrates that breeders in the highland, District of Minahasa, and the lowland, District of North Minahasa, had a varied scale of broiler raising, ranging from 750 broilers up to 22.000 broiler

in each period of raising. In this research, three business scales were obtained: small scale (<5.000 broilers), middle scale (>5.000-10.000 broiler) and large scale (>10.000 broilers). Distribution of business scale in the broiler raising from four Sub-districts representing the lowland and highland respectively was hardly equally distributed. It, then, was varied between 1.000 to 20.000 broilers, and there were only some breeders raising above 20.000 broilers and some had 750 broilers. In detail, the different business scale of broiler husbandry had a relation with business's model and objective. Typically, breeders raising broiler under small-scale husbandry only aimed for side job and broiler's cage was placed close to breeder's house and residents. Contrastingly, breeders raising under medium and large scale of broiler husbandry had separated cages, which were far enough from residential.

Climatological environment in two research's sites based on data derived from BMKG of North Sulawesi [15] is shown in following Table 1.

Table 1. Mean of maximal and minimal temperature, and humidity in the lowlands and highlands

Details	The Lowlands (Dimembe+Kalawat)		The Highlands (Sonder +Tondano Utara)	
	Morning	Afternoon	Morning	Afternoon
	Minimal Temperature (⁰ C)	25,87	26,46	19,75
Maximal Temperature (⁰ C)	30,25	33,00	29,50	30,25
Humidity (%)	84,60	75,00	89,00	79,00

Source: BMKGSulut (2018)

Further, broiler's strains raised and commercial ransom given, in general, were depended on supply of local poultry shop. In the lowlands, broiler's strains raised was Indian river and Lohmann, and the ransom used was product of Comfeed and Charon Pokhpan. While, in the highlands, broiler's strains was Arbor and Anwar Sirat, using ransom of Charon Pokhpan and Cargill. Specifically, the result of this research against broiler's performance in the lowlands and highlands can be seen from below Table 2.

Table 2. Broiler's performance in the lowlands and highlands of North Sulawesi

Details	The Lowlands			The Highlands		
	Business Scale			Business Scale		
	Small	Medium	Large	Small	Medium	Large
Weight (kg/broiler)	1,32	1,19	1,26	1,53	1,40	1,69
Ration conversion	2,03	1,83	1,87	1,89	2,07	2,13
Broiler's index	1,72	1,74	1,92	1,63	1,58	1,53
Mortality (%)	9,50	5,14	7,04	5,30	5,62	7,24
Raising period per production period (day)	37	36	35	40	41	42
Profit (Rp/broiler)	11.200	11.375	11.850	10.645	9.500	9.250
Business model	Side job	Semi- commercial	Commercial	Side job	Semi- commercial	Commercial
Raising pattern and marketing	All in-all out	All in-all out	All in-all out	All in-all out	All in-all out	All in-all out
Pattern of production equipment	Partnership	Partnership	Partnership	Partnership	Partnership	Partnership
Labor	Family	Family and hired labors	Family and hired labors	Family	Family and hired labors	Family and hired labors

According to data mentioned in the Table 2 above, it depicts that typical breeders in the lowlands raised broilers within 36 days by its average weight of 1,2-1,3 kg/broiler. In the highlands, breeders raised generally broilers

for 41 days with its average weight of 1,4-1,7 kg/broiler. It was due to market's demand in certain areas was likely different. In all business scales, all in-all out system was used since breeders run their business under partnership program with the main company, so that procurement of production equipment (feeds, seeds, medicines, vitamins, and technology) was mostly supplied by the main company, excluding labor, cages, and cage's tools. The all in-all out system means that total of incoming and outgoing broilers going to be harvested is similar due to similar age. To know broiler's technical performance, the calculation of broiler's index was performed to show that small-scale business in the highlands had better technical performance than large-scale business; though, its value of broiler's index was smaller than large-scale broiler's husbandry in the lowlands. It was caused by the outbreak infection of broiler's disease in the highlands during the research performed. A disease is one of determining factors in decreasing productivity of broiler. Therefore, broiler's profitability in a large-scale business in the lowlands located in the District of Minahasa Utara was greater than a small-scale business, and profitability in a small scale-business of broiler's husbandry in the highlands had apparently relative higher than other business scales.

3.2. Total of breeders applying biosecurity

Biosecurity is management action performed to prevent spreading of disease's seed existing in any husbandry and contaminating other husbandries or surrounding residential. In this research, it focused on application biosecurity observed and assessed. The biosecurity procedure in two application levels is in the Pre-entry, or before coming to husbandry's site, and Point of entry, or on-husbandry's site. These biosecurity applications performed in two different sites are aimed to prevent disease's seed directly interacted with broilers raised. Whereas any disease's seeds successfully penetrated the first level (Pre-entry), there is one level mandatorily secured by breeders to prevent such disease's seed contaminating other broilers within cages, which is biosecurity in the Point of entry. Hence, the finding of the research shows that total of breeders applying biosecurity in the Pre-entry located in the District of North Minahasa (the lowlands) and District of Minahasa (the highlands) had no significantly different. This can be seen from following Table 3.

Table 3. Biosecurity application by broiler's breeders in the Pre-entry

Details	District of North Minahasa (%)			District of Minahasa (%)		
	Business scale			Business scale		
	Small	Medium	Large	Small	Medium	Large
There are no other breeders within the range of 1 km	40	40	60	0	0	0
There is no sharing of equipment with other breeders	60	80	80	20	20	20
All transportation tools are sprayed with disinfectant	20	20	40	20	20	20
Poultry's waste is not taken back into the cage	100	80	100	40	40	20

Based on above Table 3, it describes that biosecurity application in the Pre-entry conducted by breeders in the lowlands (District of North Minahasa) was higher than breeders in the District of Minahasa (the highlands) of all ownership scale. It was caused by husbandry's site in District of Minahasa relatively close to residential; while broiler's husbandry in District of North Minahasa was far enough from residential. This husbandry's site far from residential would be able to minimize direct contact of poultry and human, or with other poultry, so that it could reduce human's mobility, animals, disease's seed from one cage to residential, and *vice versa*. The further the husbandry's site from residential and other husbandries, the smaller the possibility of disease's seed contamination [8,16,17]. The designing of broiler's cages in District of Minahasa, initially, was far from residential, but the massive and rapid development of population made husbandry's site close to residential eventually. Also, another biosecurity having been implemented by breeders in both Districts of North Minahasa and Minahasawas spraying with disinfectant. In the level of Pre-entry, spraying was performed in broiler's distribution tools aimed to eliminate disease's seeds derived from outside of husbandry [18]. The breeders in the District of Minahasa Utara had better waste management than breeders in the District of Minahasa, nearly almost 100 % of breeders not taking broiler's waste to other husbandries that could spread disease's seeds. Further, breeders in the District of Minahasa were just 20-40% performing better waste management.

In the level of point of entry, breeders apply biosecurity aimed to prevent diseases, if there is disease contamination derived from the Pre-entry up to coming to the cages. This biosecurity applications are establishing fence and locking key, hiring medical expert, having bathroom and additional clothes for labors, maintenance using all in-all out system and removing unsold products from the cages (Table 4).

Then, the findings of this research describe that breeders in both districts almost applied biosecurity measure. 40% and 60% of breeders located in District of North Minahasa and Minahasahad fence and locked door. Locking the cage's doors was one of efforts to limit human's mobility, domestic pets and wild animals, which it was supported with previous researches [10,11] stressing that fence and door locking are significant to limit human's mobility and vehicles that can assumedly bring disease's seeds coming inside of husbandry. Accordingly, breeders in both districts were breeder conducting partnership, where its product/broiler marketing was performed by main company. As consequence, main company prohibited partner breeders to sell their broiler by themselves (retailing). Therefore, none of breeders did they sell their broiler in market, and there were no broilers back to the cages as they had been brought by main company to be sold. Broiler's health became main priority of both breeders in the research's site. Significantly, broiler's health during their raising had to be taken care by medical expert in order to take preventive caution whereas any issues related to broiler's health. To do so, most breeders had to hire medical expert in disease prevention program in their husbandry. In the context of raising, most of breeders had applied all in-all out system, implying that total of incoming and outgoing broilers had to be exactly the same in order to take supervisory of broiler's health. This finding is in line with previous research (17-19), stating that breeders adopt and apply principles of biosecurity to prevent contamination of disease's seeds in and out of husbandry's site.

Table 4. Biosecurity application by broiler's breeders in the level of point of entry

Details	District of North Minahasa (%)			District of Minahasa (%)		
	Business scale			Business scale		
	Small	Medium	Large	Small	Medium	Large
Having fence and locking the cages' doors	40	20	40	60	80	60
Hiring medical expert	60	80	100	80	60	80
Having bathroom and additional clothes	40	60	80	0	20	20
Maintenance using all in-all out system	80	80	100	60	80	80
Unsold products not returned to the cages	100	100	100	100	100	100
Dead poultry was burnt/buried	60	80	100	80	80	80
Conducting early disease detection	80	80	100	60	80	100
Having SOP in conducting any activity in the cages	20	20	40	0	0	20
Vehicles should be cleaned as entering husbandry's site	20	20	10	0	0	20

From above data in the Table 4, it depicts that breeders in the District of Minahasa were mostly not having bathroom and additional clothes for their labors and owner since the distance to their house was relatively near, while breeders in the District of North Minahasa (the lowlands) had bathroom and additional clothes for their labors and owner since the husbandry's site was relatively far from their house (residential). If broiler was infected and dead by any disease, breeders would take preventive caution of disease contamination by burying and burning dead broilers (60-100%). Moreover, breeders in both districts within all business scales had performed activity in detecting broiler's disease. For biosecurity aspect concerning that vehicles entering husbandry's site had to be cleaned, only small part of breeders in the District of MinahasaUtara had applied it, but, contrastingly, most breeders in the District of Minahasa did not apply such biosecurity aspect. As reasons, particularly, breeders in the District of Minahasacould not clean vehicles since there were many vehicles passing through husbandry, so that it required additionally huge costs used to clean each vehicle. Meanwhile, small part of breeders in the District of MinahasaUtara performed such biosecurity action since there was only one vehicle from main company delivering day old chick (DOC) and feed supply entering husbandry's site.

3.3. Statistical analysis of biosecurity application by broiler's breeders

The finding of this research demonstrates that the level of biosecurity application in the pre-entry located in the District of apNorth Minahasa was really different ($P < 0.05$) with biosecurity application conducted in the District of Minahasa. Furthermore, biosecurity application in the level of point of entry was really similar ($P > 0.05$) between breeders in both districts within all business scales (Table 5).

Table 5. Analysis of biosecurity application in the District of North Minahasa and Minahasa

Biosecurity's Site	District		STD
	North Minahasa	Minahasa	
Prior to enter husbandry's site	2,38 ^a	1,18 ^b	0,43
On-husbandry's site	0,79 ^a	0,71 ^a	0,51

Note: Value of different letters in the similar row shows really different ($P < 0.05$).

STD is Standard Error of Treatment Means

The biosecurity application in the level of pre-entry in the District of North Minahasa was much better than biosecurity application in the District of Minahasa ($P < 0.05$). It can be seen from above Table 5, where breeders located in the District of North Minahasa had mostly applied biosecurity aspects in this level than breeders in the District of Minahasa, only small part of breeders applying biosecurity in this level. One of causing factors was that husbandry's site involved in this research, District of North Minahasa, was far from residential, and husbandry's site located in the District of Minahasawas close to residential. Subsequently, biosecurity application in the level of point of entry was relatively similar ($P > 0.05$) conducted by breeders located in both districts. It means that those breeders in both districts had mostly mastered better technique of broiler cultivation and they also concerned on surrounding environment. Breeders had understood significance of biosecurity aspects to minimize loss risk in managing broiler husbandry since they had obtained training on how to plan, apply, and evaluate biosecurity aspect [16,17,19,20,21].

Conclusion

1. Raising pattern of broilers in the lowlands of District of North Minahasa and the highlands of District of Minahasahad no different, excluding raising period of each production period. In detail, raising period in the lowlands was averagely 36 days, and 41days in the highlands. Small-scale business in the highlands had better technical performance than large scale; though, its broiler's index was lower than broiler husbandry in the lowlands under large-scale business.
2. The biosecurity application performed by broiler's breeders in the pre-entry level in the District of Minahasa was much better than breeders in the District of Minahasa. Meanwhile, the biosecurity application performed by breeders in both research's sites in the point of entry level did not show significant difference.

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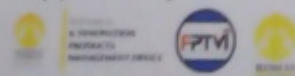
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Raise Pattern and Biosecurity Application by Broiler Breeders on Different Topography in North Sulawesi Province

Erwin Wantasen ^{*1}, Sintya J.K. Umboh¹, and E.K.M Endoh¹

¹Department of Socio-Economics, Faculty of Animal Husbandry, Sam Ratulangi University, Manado, Indonesia

* Corresponding author: erwinwantasen@yahoo.co.id

Abstract. The purpose of this study was to obtain information about the raising pattern and level of biosecurity application conducted by broiler breeders in different types of topography in North Sulawesi Province. The research location was the District of Minahasa representing the highlands and District of Minahasa Utara representing the lowland region. The scale of broilers husbandry in the two study areas consisted of small scale (<5000 broilers), medium scale (> 5000 - 10000 broilers) and large scale (> 10000 broilers) for each of production periods. At each scale, 5 breeders were taken as respondents, so that the total of respondent samples was 30 breeders. Data obtained then was analyzed descriptively and quantitatively. The result shows that broilers in the lowlands generally raised for 4-5 weeks with an average weight of 1.2 - 1.3 kg/broiler, while broilers were raised by breeders in the highlands had gained weight of 1.4 - 1.7 kg/broiler. Raising broilers in small-scale business used all in-all out system with family workers, while breeders in medium and large-scale husbandry in both topographic areas used raising pattern and marketing gradually using special labor. As many as 100% of breeders in the lowland areas within a large-scale husbandry had already health programs under the supervision of veterinarians and 80% of large-scale breeders in the highlands did the same. In both research areas, it showed that broiler breeders on the three scales made effort to prevent the risk by burning and burying dead chickens with a percentage of 60-100%.

Keywords: Raising pattern, breeders' ability, broiler

1. Introduction

One of husbandry commodities becoming source of living and protein for society is broiler. Broiler is relatively well-liked by breeders since it can gain weight until 1,2 -1,3 kg within relatively short period of raising, during 4-5 weeks. It may happen if it is supported with a better management of production conducted by breeders [1,2].

Recently, the condition of broiler has sometimes dealt with less profitable situation, where there is unstable price of production infrastructure in the market. Such condition, then, is occurring annually, so that small-scale breeders suffer from loss. Technically speaking, there is a difference between raising pattern and profitability in broiler cultivated in low and high land. In any high temperature, broiler's performance drastically decreases, so there is a different profitability with broiler cultivated in fresher and more mild temperature. All those factors will determine breeders' productivity in raising broiler, mainly on business's pattern and scale. Both business's pattern and scale will result on business's productivity and efficiency [3]. Improvement of economic efficiency can be performed by using a better technology, using total of input and optimal raising scale [4]. The husbandry, theoretically, is divided into four business's pattern, namely side-job business, branch of business, main business, and industry. Those business's patterns are necessarily required in a better management of raising in order to obtain broiler always in good performance and condition, so that breeders can avoid any loss occurred. Therefore, a step to be taken by breeders is applying biosecurity technique. Biosecurity is breeders' effort to avoid disease's penetrated infection from one husbandry to other husbandries [5,6].

North Sulawesi is one of regions producing broiler by total of boiler's population in 2018 of 7,7 million broilers. Two districts having the largest population of broiler in North Sulawesi are District of Minahasa Utara, with total of population of 4.5 million broilers (58.4%) and production of broiler of 4,118 ton; and District of Minahasa, having total of broiler's population of 1.9 million broilers (25.3%) with production of broiler of 1,516 ton [7]. District of North Minahasa is located in the lowland, while, contrarily, District of Minahasais in the highland. This topographic different is presumably assumed resulting on difference of raising pattern and husbandry's productivity due to different physical environment. Non-conducive environment will cause broiler vulnerably infected by any disease, meaning that both breeders in these districts should apply biosecurity principles. Applying principle of biosecurity is by reducing any risk resulted by human's mobility in the cages, animals, organic or inorganic materials [8]. Particularly, principles of biosecurity comprise of establishing, improving, reducing, detecting, dimension, and selecting. Such risk mentioned above should be avoided since it will potentially become entrance of diseases' seeds. Research on biosecurity application has been done by previous researchers [9-11]. However, information on biosecurity application by broiler's breeders in different topography, such as in the low and highland along with its raising pattern, is relatively limited. Hence, this research will analyze different raising pattern of broiler, profitability, and biosecurity application by breeders in both District of Minahasa and District of North Minahasa.

2. Research Methodology

2.1. Sampling method and data collecting technique

The research was conducted in District of North Minahasarepresenting the lowland and District of Minahasarepresenting the highland. It was done on January to February 2019. In each of districts, it then was selected 2 (two) sub-districts purposively by consideration that it had breeders having ever obtained training and applied regional biosecurity management with the largest population of broiler in respectively every district [7]. Sub-district turned as research's site was Sub-district of DimembeandKalawat (District of North Minahasa), Sub-district of Sonder andTondano Utara (District of Minahasa). There were three scales of broiler husbandry in the District of North Minahasa, such as <5000 broilers(32 breeders), >5000-10000 broilers (16 breeders) and>10000 broilers (10 breeders). Meanwhile, breeders in the District of Minahasa had business scale of <5000 broilers (25 breeders), >5000-10000 broilers (14 breeders) and >10000 broilers (10 breeders). In each of business scales, 5 breeders, thus, were purposively selected in each district respectively [12] by consideration that those breeders had followed training of biosecurity management in broiler's husbandry, so the total of samplings was 30 breeders.Further, data was collected by survey technique using questionnaire. Data gathered then was primary data comprising of technical data, such as mortality, broiler's weight, feeds consumption, business scale, business model, raising pattern, procurement model of production equipment, income, and aspects of biosecurity application used by breeders.

2.2 Data analysis

Data collected was, hence, analyzed descriptively and quantitatively. Descriptive analysis comprised on characteristic of broiler husbandry, such weight, raising pattern, marketing, business model, procurement model of production equipment, labor, raising period. Whereas, quantitative analysis consisted on calculation of broiler's index and income using following formulation, [4]

$$\text{Broiler's index} = \frac{(100 - \% \text{ mortality}) \times \text{mean of weight/broiler}}{\text{feeds conversion} \times \text{raising period}} \dots\dots\dots (1)$$

$$\text{Income} = \text{TR} - \text{TC} \dots\dots\dots (2)$$

Where:

TR = Total of income in broiler husbandry (Rp/production period)

TC = Total of production cost in broiler husbandry (Rp/production period)

Next, the calculation of biosecurity variable used score obtained from data collected. Data management utilized descriptive method and statistical analysis. Each response of respondents was classified into fivecategories and given score. The score was stated in numerical of 1,2,3,4, and 5 for each answer, which the highest score was 5 and the lowest was 1 [13].Such score, later, was categorized into 2 parts, namely Pre-Entryand Point of Entry. In addition, such score in respective groups was calculated in total and a mean was gained from it. Further, this score was analyzed using Independent Sample *t* Testassisted by SPSS.22 program, by following formulation as follows, [14]

$$t = \frac{Xa - Xb}{Sp \sqrt{\frac{1}{na} + \frac{1}{nb}}} \dots\dots\dots (3)$$

Where:

Xa = mean of group a, Xb = mean of group b, Sp = combined deviation standard, na = total of samples in group a, nb = total of samples in group b.

3. Findings and Discussion

3.1. Business model

The result of this research demonstrates that breeders in the highland, District of Minahasa, and the lowland, District of North Minahasa, had a varied scale of broiler raising, ranging from 750 broilers up to 22.000 broiler

in each period of raising. In this research, three business scales were obtained: small scale (<5.000 broilers), middle scale (>5.000-10.000 broiler) and large scale (>10.000 broilers). Distribution of business scale in the broiler raising from four Sub-districts representing the lowland and highland respectively was hardly equally distributed. It, then, was varied between 1.000 to 20.000 broilers, and there were only some breeders raising above 20.000 broilers and some had 750 broilers. In detail, the different business scale of broiler husbandry had a relation with business's model and objective. Typically, breeders raising broiler under small-scale husbandry only aimed for side job and broiler's cage was placed close to breeder's house and residents. Contrastingly, breeders raising under medium and large scale of broiler husbandry had separated cages, which were far enough from residential.

Climatological environment in two research's sites based on data derived from BMKG of North Sulawesi [15] is shown in following Table 1.

Table 1. Mean of maximal and minimal temperature, and humidity in the lowlands and highlands

Details	The Lowlands (Dimembe+Kalawat)		The Highlands (Sonder +Tondano Utara)	
	Morning	Afternoon	Morning	Afternoon
	Minimal Temperature (⁰ C)	25,87	26,46	19,75
Maximal Temperature (⁰ C)	30,25	33,00	29,50	30,25
Humidity (%)	84,60	75,00	89,00	79,00

Source: BMKGSulut (2018)

Further, broiler's strains raised and commercial ransom given, in general, were depended on supply of local poultry shop. In the lowlands, broiler's strains raised was Indian river and Lohmann, and the ransom used was product of Comfeed and Charon Pokhpan. While, in the highlands, broiler's strains was Arbor and Anwar Sirat, using ransom of Charon Pokhpan and Cargill. Specifically, the result of this research against broiler's performance in the lowlands and highlands can be seen from below Table 2.

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for 41 days with its average weight of 1,4-1,7 kg/broiler. It was due to market's demand in certain areas was likely different. In all business scales, all in-all out system was used since breeders run their business under partnership program with the main company, so that procurement of production equipment (feeds, seeds, medicines, vitamins, and technology) was mostly supplied by the main company, excluding labor, cages, and cage's tools. The all in-all out system means that total of incoming and outgoing broilers going to be harvested is similar due to similar age. To know broiler's technical performance, the calculation of broiler's index was performed to show that small-scale business in the highlands had better technical performance than large-scale business; though, its value of broiler's index was smaller than large-scale broiler's husbandry in the lowlands. It was caused by the outbreak infection of broiler's disease in the highlands during the research performed. A disease is one of determining factors in decreasing productivity of broiler. Therefore, broiler's profitability in a large-scale business in the lowlands located in the District of Minahasa Utara was greater than a small-scale business, and profitability in a small scale-business of broiler's husbandry in the highlands had apparently relative higher than other business scales.

3.2. Total of breeders applying biosecurity

Biosecurity is management action performed to prevent spreading of disease's seed existing in any husbandry and contaminating other husbandries or surrounding residential. In this research, it focused on application biosecurity observed and assessed. The biosecurity procedure in two application levels is in the Pre-entry, or before coming to husbandry's site, and Point of entry, or on-husbandry's site. These biosecurity applications performed in two different sites are aimed to prevent disease's seed directly interacted with broilers raised. Whereas any disease's seeds successfully penetrated the first level (Pre-entry), there is one level mandatorily secured by breeders to prevent such disease's seed contaminating other broilers within cages, which is biosecurity in the Point of entry. Hence, the finding of the research shows that total of breeders applying biosecurity in the Pre-entry located in the District of North Minahasa (the lowlands) and District of Minahasa (the highlands) had no significantly different. This can be seen from following Table 3.

Table 3. Biosecurity application by broiler's breeders in the Pre-entry

Details	District of North Minahasa (%)			District of Minahasa (%)		
	Business scale			Business scale		
	Small	Medium	Large	Small	Medium	Large
There are no other breeders within the range of 1 km	40	40	60	0	0	0
There is no sharing of equipment with other breeders	60	80	80	20	20	20
All transportation tools are sprayed with disinfectant	20	20	40	20	20	20
Poultry's waste is not taken back into the cage	100	80	100	40	40	20

Based on above Table 3, it describes that biosecurity application in the Pre-entry conducted by breeders in the lowlands (District of North Minahasa) was higher than breeders in the District of Minahasa (the highlands) of all ownership scale. It was caused by husbandry's site in District of Minahasa relatively close to residential; while broiler's husbandry in District of North Minahasa was far enough from residential. This husbandry's site far from residential would be able to minimize direct contact of poultry and human, or with other poultry, so that it could reduce human's mobility, animals, disease's seed from one cage to residential, and *vice versa*. The further the husbandry's site from residential and other husbandries, the smaller the possibility of disease's seed contamination [8,16,17]. The designing of broiler's cages in District of Minahasa, initially, was far from residential, but the massive and rapid development of population made husbandry's site close to residential eventually. Also, another biosecurity having been implemented by breeders in both Districts of North Minahasa and Minahasawas spraying with disinfectant. In the level of Pre-entry, spraying was performed in broiler's distribution tools aimed to eliminate disease's seeds derived from outside of husbandry [18]. The breeders in the District of Minahasa Utara had better waste management than breeders in the District of Minahasa, nearly almost 100 % of breeders not taking broiler's waste to other husbandries that could spread disease's seeds. Further, breeders in the District of Minahasa were just 20-40% performing better waste management.

In the level of point of entry, breeders apply biosecurity aimed to prevent diseases, if there is disease contamination derived from the Pre-entry up to coming to the cages. This biosecurity applications are establishing fence and locking key, hiring medical expert, having bathroom and additional clothes for labors, maintenance using all in-all out system and removing unsold products from the cages (Table 4).

Then, the findings of this research describe that breeders in both districts almost applied biosecurity measure. 40% and 60% of breeders located in District of North Minahasa and Minahasahad fence and locked door. Locking the cage's doors was one of efforts to limit human's mobility, domestic pets and wild animals, which it was supported with previous researches [10,11] stressing that fence and door locking are significant to limit human's mobility and vehicles that can assumedly bring disease's seeds coming inside of husbandry. Accordingly, breeders in both districts were breeder conducting partnership, where its product/broiler marketing was performed by main company. As consequence, main company prohibited partner breeders to sell their broiler by themselves (retailing). Therefore, none of breeders did they sell their broiler in market, and there were no broilers back to the cages as they had been brought by main company to be sold. Broiler's health became main priority of both breeders in the research's site. Significantly, broiler's health during their raising had to be taken care by medical expert in order to take preventive caution whereas any issues related to broiler's health. To do so, most breeders had to hire medical expert in disease prevention program in their husbandry. In the context of raising, most of breeders had applied all in-all out system, implying that total of incoming and outgoing broilers had to be exactly the same in order to take supervisory of broiler's health. This finding is in line with previous research (17-19), stating that breeders adopt and apply principles of biosecurity to prevent contamination of disease's seeds in and out of husbandry's site.

Table 4. Biosecurity application by broiler's breeders in the level of point of entry

Details	District of North Minahasa (%)			District of Minahasa (%)		
	Business scale			Business scale		
	Small	Medium	Large	Small	Medium	Large
Having fence and locking the cages' doors	40	20	40	60	80	60
Hiring medical expert	60	80	100	80	60	80
Having bathroom and additional clothes	40	60	80	0	20	20
Maintenance using all in-all out system	80	80	100	60	80	80
Unsold products not returned to the cages	100	100	100	100	100	100
Dead poultry was burnt/buried	60	80	100	80	80	80
Conducting early disease detection	80	80	100	60	80	100
Having SOP in conducting any activity in the cages	20	20	40	0	0	20
Vehicles should be cleaned as entering husbandry's site	20	20	10	0	0	20

From above data in the Table 4, it depicts that breeders in the District of Minahasa were mostly not having bathroom and additional clothes for their labors and owner since the distance to their house was relatively near, while breeders in the District of North Minahasa (the lowlands) had bathroom and additional clothes for their labors and owner since the husbandry's site was relatively far from their house (residential). If broiler was infected and dead by any disease, breeders would take preventive caution of disease contamination by burying and burning dead broilers (60-100%). Moreover, breeders in both districts within all business scales had performed activity in detecting broiler's disease. For biosecurity aspect concerning that vehicles entering husbandry's site had to be cleaned, only small part of breeders in the District of Minahasa Utara had applied it, but, contrastingly, most breeders in the District of Minahasa did not apply such biosecurity aspect. As reasons, particularly, breeders in the District of Minahasacould not clean vehicles since there were many vehicles passing through husbandry, so that it required additionally huge costs used to clean each vehicle. Meanwhile, small part of breeders in the District of Minahasa Utara performed such biosecurity action since there was only one vehicle from main company delivering day old chick (DOC) and feed supply entering husbandry's site.

3.3. Statistical analysis of biosecurity application by broiler's breeders

The finding of this research demonstrates that the level of biosecurity application in the pre-entry located in the District of apNorth Minahasa was really different ($P < 0.05$) with biosecurity application conducted in the District of Minahasa. Furthermore, biosecurity application in the level of point of entry was really similar ($P > 0.05$) between breeders in both districts within all business scales (Table 5).

Table 5. Analysis of biosecurity application in the District of North Minahasa and Minahasa

Biosecurity's Site	District		STD
	North Minahasa	Minahasa	
Prior to enter husbandry's site	2,38 ^a	1,18 ^b	0,43
On-husbandry's site	0,79 ^a	0,71 ^a	0,51

Note: Value of different letters in the similar row shows really different ($P < 0.05$).

STD is Standard Error of Treatment Means

The biosecurity application in the level of pre-entry in the District of North Minahasa was much better than biosecurity application in the District of Minahasa ($P < 0.05$). It can be seen from above Table 5, where breeders located in the District of North Minahasa had mostly applied biosecurity aspects in this level than breeders in the District of Minahasa, only small part of breeders applying biosecurity in this level. One of causing factors was that husbandry's site involved in this research, District of North Minahasa, was far from residential, and husbandry's site located in the District of Minahasawas close to residential. Subsequently, biosecurity application in the level of point of entry was relatively similar ($P > 0.05$) conducted by breeders located in both districts. It means that those breeders in both districts had mostly mastered better technique of broiler cultivation and they also concerned on surrounding environment. Breeders had understood significance of biosecurity aspects to minimize loss risk in managing broiler husbandry since they had obtained training on how to plan, apply, and evaluate biosecurity aspect [16,17,19,20,21].

Conclusion

1. Raising pattern of broilers in the lowlands of District of North Minahasa and the highlands of District of Minahasahad no different, excluding raising period of each production period. In detail, raising period in the lowlands was averagely 36 days, and 41days in the highlands. Small-scale business in the highlands had better technical performance than large scale; though, its broiler's index was lower than broiler husbandry in the lowlands under large-scale business.
2. The biosecurity application performed by broiler's breeders in the pre-entry level in the District of Minahasa was much better than breeders in the District of Minahasa. Meanwhile, the biosecurity application performed by breeders in both research's sites in the point of entry level did not show significant difference.

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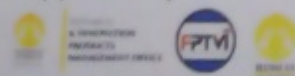
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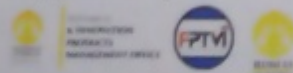
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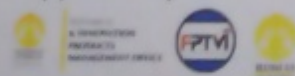
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